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ABSTRACT

The general purpose of this study is to investigate the effects of education or common schooling upon the attitudes of high school students who are socialized in tribal societies and who belong to different sociocultural groups within the total society. The specific problem is to conceptualize the independent variables which can be considered to have theoretical relevance for the formation of interpersonal attitudes, to derive from them conditions of interpersonal experience which can be expected to lead to the formation of positive attitudes, and to test the relationship between experience and attitude in an experimental design in a field setting. Chapters discuss: 1) theory of conditions of interaction to promote positive attitudes; 2) population and experimental sample; 3) treatments of forced compliance and participation in goals, observation of interaction, attitude scales, sociometric test, measurement of actual associations, testing procedures; 4) statistical results and inferences; and, 5) theoretical and practical significance, i.e. under certain conditions, different patterns of classroom interaction do affect intergroup attitudes, and lead to better understanding of the relationship between education and the integration of social and political communities. See SO 000 270 for related documents. (SBE)

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AN EXPERIMENTAL STUDY IN A NEW GUINEA SCHOOL

BY RICHARD PEARSE

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FOREWORD

by Hans N. Weiler

An important part of the research program at Stanford's International Development Education Center (SIDEC) over the past few years has been devoted to an attempt to identify the impact of various educational conditions and experiences on the formation of social and political attitudes. The individual studies that have contributed to this attempt have investigated different aspects of the general problem in a variety of settings, and with a variety of research designs.

Pearse's study of the effects of various interaction conditions upon the formation of intergroup attitudes is the first in this series to explore the usefulness of a genuinely experimental design, and provides an excellent demonstration of the many advantages of such an approach. Providing for much more rigor in the control of different variables, and of the ways in which they operate, the design allows him to present findings with considerably greater confidence.

This method has been applied to the investigation of a problem which looms large in the development of fragmented, and especially multi-ethnic, societies: the question of how attitudes toward members of different sub-groups in the society develop and change, and of the role that educational factors play in the formation of such attitudes. Pearse's findings that, under certain conditions, different patterns of classroom interaction do indeed have an effect on intergroup attitudes, has to be regarded as an important step toward a better understanding of the relationship between education and the integration of social and political communities.

PREFACE

A distinctive flavor of the research conducted by research assistants of the Stanford International Development Education Center is its multi-national context and its cross-disciplinary perspective.

I wish to thank Professor H. N. Weiler (Political Science and Education) for assistance given me during the gestation of the project in California and for his advice from Germany during the writing stage. I wish to express appreciation to Professor Robert Textor (Anthropology and Education) for constructive comments on the design and his support and additional labors during the final steps of completing the study. The disciplines and perspectives of these two men suggested the focus of the study on intergroup attitudes.

I want also to acknowledge the stimulation of Professor R. Hess's approach to political socialization and the stimulation and advice of Professor N. L. Gage whose field of Social Psychology provided a basic frame of reference for this study.

The location of the study in New Guinea followed from a recognition of the problems of national integration in this and similar polities, and from foreknowledge of cooperation and assistance from both the indigenous people of the highlands and the Australian members of the Department of Education. I especially wish to thank the students of the Goroka High School and Mr. K. Ferris, Mr. T. Black, and Dr. K. McKinnon of the Department of Education.

Thanks are due to the organizations which made the research possible: Stanford International Development Education Center for financial support for the study; the East-West Center whose International Development Fellowship enabled me to undertake two years of study at Stanford; and the Commonwealth of Australia whose financial support assisted me for two years at Stanford.

Most of all, I wish to thank my wife and family for their support and forbearance during the period when I was engaged in this study.

Richard Pearse
July 1969

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Chapter I

THE RESEARCH PROBLEM: METHODS TO IMPROVE INTERGROUP ATTITUDES

Rapid change and growth in societies, whatever their stage of growth may be, is the hallmark of the twentieth century. The capacity of the people within a society to form and maintain increasingly complex, yet flexible institutions, is a central aspect of the growth process. This capacity rests upon the emergence of many skills, sentiments, and values. Among these is the capacity of the people in those many societies divided by ethnic, social, and ideological barriers to maintain effective relationships one with the other. An important aspect of this capacity is the development of those sentiments which influence the interaction between the members of the society. In all societies the characteristics of the process of socialization through which these sentiments are acquired play an important role in the formation of these sentiments. Indeed, the constituent aspects of development -- political, economic, and social -- may be regarded as dependent upon the socialization process. Lucien Pye (1962: 51) asserts:

> The real problem in political development is therefore the extent to which the socialization process of a people provides them with the necessary associational sentiments so they can have considerable conflict without destroying the stability of the system.

The formal education system provides the major characteristics of part of the individual's socialization related to the formation of interpersonal sentiments, and, in many countries it is consciously used as an instrument to promote sentiments consonant with national growth. In one view (Hess 1968), the schools in the United States have in the past served to provide the common allegiance and the common values necessary to bring together, in a single country, immigrant groups from different ethnic and national backgrounds. Leaders in many developing countries have considered that the common attendance of different ethnic and cultural groups within a single school system assists to overcome existing or potential schisms in the society, and acts as a powerful variable to reduce the consciousness of ethnic and tribal differences and to increase solidarity sentiments between the peoples (Abernethy and Coombe 1965). Other countries, developed and underdeveloped alike, consider that the same policy may act to increase rather than diminish the hostility between social groups. Malaysia and

Fiji, two countries with competitive and potentially conflictive ethnic and cultural groups, maintain separate school systems for each group, and the view grows in the United States that attendance at a common school in the form of black-white integration may act to increase, rather than to diminish, conflict between these ethnic and cultural groups (Hess 1968: 529; Hamilton 1968: 669-685).

These different policies and perspectives toward the outcome of common schooling indicate that the potential which common schooling may have for the growth of intergroup sentiments is little understood, and that this potential may well vary with the sociopolitical relationships between the adult members of the different groups in the society. Until the effects of common schooling upon the sentiments of the young are better understood, this potential will not be utilized, or will be utilized mistakenly. The general purpose of this study is to investigate the effects of common schooling upon the sentiments of students who are socialized in tribal societies and who belong to different sociocultural groups within the total society.

Recent studies of the socialization of white and black ethnic groups and of different socioeconomic groups in the United States have investigated the relationship of common schooling as an independent variable, to the school achievement of students as the dependent variable (Coleman 1961, 1966; U. S. Commission on Civil Rights 1962). Less attention has been given to the consequences of racial integration for the formation of interethnic sentiments, but the studies reported by the Civil Rights Commission (1962) provide evidence that the very general integration variable is related to the formation of positive sentiments between the groups. White and Negro adults who experienced integrated schooling as children show a greater willingness to reside in an interracial neighborhood and have their children attend interracial schools than do comparable white and Negro adults who attended segregated schools. Moreover, the achievement of students in integrated schools has been shown to be related to the sentiments between them, rather than to the racial composition of the groups -- a relationship which led the Civil Rights Commission to infer that interracial acceptance was an independent variable for the school achievement of Negro students.

Pettigrew (1968) has attempted to define the integration variables which are related to these outcomes in terms of learning processes within the context of interethnic relationships. He infers that Negro students learn values of self and environmental control ("fate control") from white students, and that white and black students compare and evaluate their own performance and goals with those of the other group (cross-racial self evaluation). These constructs, however, do not explicitly relate to the formation of sentiments toward the other group; they are not clearly explicated, and they are unrelated to existing theory on sentiment formation and change. In addition to this conceptual weakness the correlational studies from which the inferences are drawn can lead only to relatively weak hypotheses as to the direction of causation between the variables; the inference of the Civil Rights Commission that interracial acceptance is a factor in achievement is one case in point.

Yet these studies can be taken to indicate the need to investigate the relationship between the socialization of groups of students who differ in ethnic, social, and cultural characteristics as the independent variable, and the formation of interindividual and intergroup sentiments as the dependent variable, through attempts to arrive at greater precision in the definition of the independent variables, the definition of causal relationships between these and sentiments through explicit theory, and the testing of hypotheses by means of experimental rather than correlational designs.

The specific problem for this study is to conceptualize the independent variables which can be considered to have theoretical relevance for the formation of interpersonal sentiments, to derive from them conditions of interpersonal experience which can be expected to lead to the formation of positive sentiments, and to test the relationship between experience and sentiment in an experimental design in a field setting.

While contextual variables pertaining to the mix of different groups in the school population and phenomenological variables such as those identified by Pettigrew may prove to be significant, they both derive from the basic social relationship of interaction between members of different groups which is set up by the school institution. Different forms of interaction are well established as independent variables in the formation and modification of attitudes. McDonald (1965: 307-385) identifies three forms of interaction as being most significant for attitude formation. These are the interaction between an individual and cognitive information and the interaction between an individual and other individuals, which together make up reality; the interaction between individuals and others they perceive to be behavior models; and the individual's interaction with social groups which act as reference groups. Each form of interaction when experienced in the school has an effect on attitude formation limited by the attitudes the individual has established through prior or contemporaneous interactions with members of his family. The relative significance of these forms of interaction cannot be evaluated easily in a general way, but the effect of the individual's interaction with cognitive information appears to be particularly susceptible to the limitations imposed by prior attitudes and the influence of the family (McDonald 1965: 381).

The focal independent variable in this study is the interaction of the individual with reality in the form of his interaction with members of other sociocultural groups. The institutional setting is the classroom environment of a school. The sociocultural setting is a society marked by traditional tribal social organization and sentiments. The conditions of interaction will be conceptualized in the framework of the existing body of constructs pertinent to attitude formation and change known as consistency theory. The _focal dependent variable_ is sentiments related to an individual's willingness to associate with members of other sociocultural groups in interactions of different degrees of intimacy.

Throughout this study, the words sentiment, disposition, and attitude are used interchangeably. An attitude is conceived of (after Krech, Crutchfield, and Ballachey 1962: 146) as an enduring system of cognitions, feelings, and action tendency centering about an attitude object. Operational definitions of attitude are provided below for each of the criterion measures.

Chapter II

THE THEORY: CONDITIONS OF INTERACTION TO PROMOTE POSITIVE ATTITUDES

The relationship of contiguity between individuals to the formation of inter-individual attitudes has a place in a number of theories of attitude formation and change. In the theories which form the bases for the development of this study, the general model for the relationship is that contiguity leads to forms of interaction between the individuals and the forms of interaction in turn act as independent variables on the formation and change of attitudes. These forms of interaction vary in specifiable ways, and a number of different forms or types of interaction have different outcomes for the formation of attitudes. The theoretical outcomes of different conditions can be examined to yield the conditions required to promote positive sentiments.

From the analysis of different forms of interaction across different institutional settings and across different cultures, Homans (1950: 112) inferred that where the social system required individuals to interact frequently, the outcome would be the growth of sentiments of liking between the individuals. However, the presence of social constraint and frequent interaction are not to be inferred to be either necessary or sufficient conditions for the formation of positive attitudes. These characteristics of interaction could be expected to lead to the formation of positive attitudes only where three other variables are satisfied: the activity in which the interaction takes place must be regarded as neutral or favorable by the participants; it must involve non-authority relationships between them; and the parties to the interaction must be achieving their goals (Homans 1950: 115-118).

From their study of the formation of the interethnic attitudes of individuals in the social context of integrated housing, Deutsch and Collins (1951) inferred that the conditions of interaction which led to the formation of positive attitudes were the interactions of individuals from the different ethnic groups, and the presence of a group norm or standard which was positive toward interaction. In a subsequent study directed toward ascertaining the relative weight of these conditions, Wilner, Walkley, and Cook (1955) asserted that the frequency of interaction between the individuals from different ethnic groups was the more important condition of the two.

These empirical studies agree with the importance of the frequency of interaction as proposed by Homans, and with the importance of social constraints, represented explicitly in the study as a group norm, and implicitly by the need of the individuals to obtain the only available housing. The goals of the individuals and the authority dimension in interaction were not explicitly examined, though they may have been implicit conditions of the interactions. While these studies do not add to the hypothetical variables of interaction related to positive change, they demonstrate empirical support for two of Homans' propositions.

M. R. Yarrow, J. D. Campbell, and L. F. Yarrow (1958) provide empirical evidence for the effect of one form of social constraint upon the behavior of adolescent boys. The rules and the expectations of supervisors in an interracial boys' camp were sufficient to induce boys to conform to the pattern expected of them, a pattern which varied from the behavior which might have been predicted from their dispositions toward members of the other race.

The relationship between the goals of the individuals in interaction and behavior was the subject of an empirical study by M. Sherif (1956) in the field setting of a boys' camp. Evidence from the changes in observed behavior of boys confirmed that where the attainment of one group goal, and hence of each group member's goal, meant the non-attainment of a goal by another group, and hence the goal of a member of that group, the hostility between members of the groups increased. However, even from a state of increased hostility, when the achievement of each group's goal was brought about by the effort of both groups, the interaction between the groups led to an increase in friendly behavior. This led Sherif to hypothesize that the pursuit and attainment of a superordinate goal leads to the formation of positive dispositions.

A study by Deutsch (1958) yields further evidence of the effect of goal-directed interaction in the context of student groups. Students who were able to attain a goal by means of independent activity or cooperative activity and then present an independent solution, among other outcomes demonstrated less friendliness toward others in their groups than did students who were required to work together and to present one common solution as the goal. In this study then, group goals, or goals which can be attained only if individuals combine their efforts, are more effective in promoting friendly behavior than are common goals, those shared by individuals which may be attained by independent individual action, where these goals are a condition of interaction between the individuals. McDonald (1965: 540) has generalized this result to suggest that in the classroom the accomplishment of a group goal increases the cohesiveness and attractiveness of the group to individuals.

These studies provide an explication of the variable Homans describes as the satisfaction of goals, in terms of goal-directed activity which is integral to the relationship of the individuals engaged in interaction, and provide a more explicit statement of interaction variables together with empirical support for their effect on sentiments and behavior.

Fritz Heider's (1958) conceptualization of the role of balance in disposition formation allows analysis of the characteristics of the activity in which individuals in interaction engage. Homans inferred that the activity would need to be considered to be neutral or favorable if individuals were to develop positive dispositions toward one another. In Heider's theory the consequences of the individual's sentiment toward an activity in which two individuals are engaged for his sentiment toward the other person can be examined by reference to the initial disposition between the individuals, which may be positive, neutral, or negative, and by reference to the individual's initial disposition toward the activity, also positive, neutral, or negative.

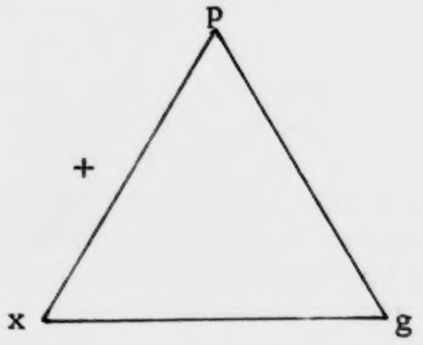
If there is an initial positive disposition between the individuals and both like the activity or both dislike the activity, the positive disposition remains unaltered. That is, a disliked activity is consistent with a positive attitude between individuals if this already exists. In the case where there is an initially positive disposition between the individuals and one is neutral toward or dislikes the activity while the other likes the activity, either the individual who likes the activity comes to dislike it, with his positive attitude toward the other individual unchanged, or this individual continues to like the activity but comes to dislike the other individual. That is, the outcome for the sentiment between the individuals is indeterminate.

If the initial disposition between the individuals is negative or neutral and both like the activity, the resultant sentiment is one of liking between the individuals. If both should dislike the activity, either the sentiment between individuals will remain unchanged and one will change his attitude to dislike of the activity, or a sentiment of liking will grow between the individuals. Again, the outcome is indeterminate, but one's dislike of the activity may be consistent with the growth of a favorable attitude toward the other. Where one of the individuals likes the activity and the other does not, then the initial neutral or negative disposition between the two will remain unaltered.

Where both of the individuals interacting in an activity are favorably disposed toward it, the outcome will always be favorable dispositions between them. Where both are unfavorably disposed toward it, the outcome is a favorable disposition between them if they were initially favorably disposed toward each other, but if they were initially neutral or unfavorably disposed toward each other, this negative relationship may, or may not, change. When one of the individuals likes the activity and one does not, the outcome is an unfavorable disposition between them, when the initial attitude is unfavorable or neutral. The result may be either a favorable attitude between them or an unfavorable attitude when the initial attitude is favorable.

Heider's conceptualization means that the outcome of two individuals' interaction in an activity must be regarded as contingent upon both the initial disposition between them and their individual dispositions toward the activity. Unlike Homans' inference that interaction in a neutral or liked activity is a necessary condition for interaction to lead to positive sentiments between the individuals, Heider identifies situations in which a disliked activity may also be consistent with a positive sentiment. These are the situation where the initial attitude between them is positive and both dislike the activity, when the outcome is always positive, and the situation when the initial attitude is negative or neutral and both dislike the activity when the outcome may be positive.

The importance of the attainment of the individual's goals for the outcome of interaction in Heider's theory can be derived from the following propositions. In the condition of interaction identified as behavior to attain group goals, the activity in which each individual is engaged is regarded as instrumental to the attainment of a goal shared between the individuals. The activity and the goal thus share the property of belonging together, a property which induces a unit formation in Heider's theory (1958: 201). Because the activity facilitates, or brings about, the goal, it is positively related to the goal. Further, the goal is regarded as being desired by the individual. It follows that the relationship between each individual (p) and the activity (x) will tend to be positive (Fig. 1).



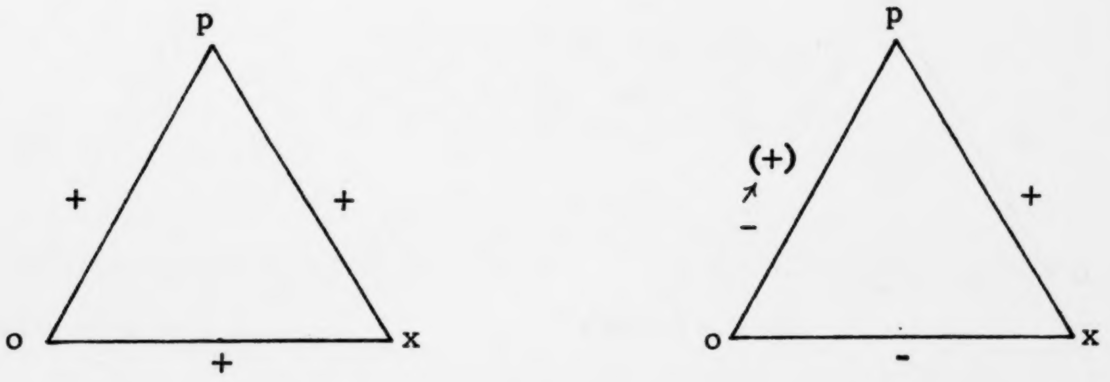
p = individual

g = goal

x = activity

Figure 1

Interaction between individuals in the condition of a group goal corresponds to the situation in which both individuals like the activity. As we have seen above, this situation always leads to positive dispositions between the individuals whether the individuals were initially favorably or initially unfavorably disposed to one another (Fig. 2).



p = individual
o = individual
x = activity

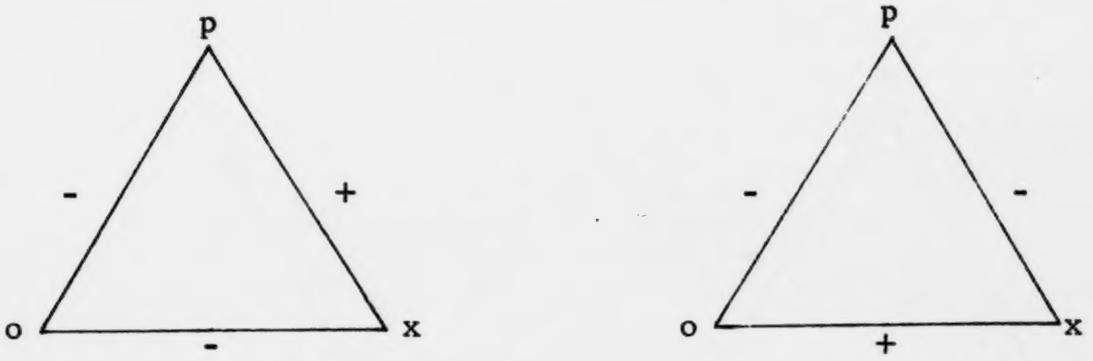
- = negative relation
+ = positive relation
→ = change

Figure 2

Predictions from Heider's theory then, appear to be consistent with Homans' inference as to the importance of goal attainment and Deutsch and Sherif's empirical findings of the consequences of interaction under the condition of a group goal.

Homans' general proposition that non-authority relationships between the people in interaction are conducive to the formation of positive sentiments can also be examined through Heider's conditions of a balanced state. In this case, one individual, p, may be assumed to have more power to influence the activity of the other, o. The significance of the relative status of individuals in an activity can also be examined in the same framework. Here a person's general social status becomes an attribute of the person. Although these attributes of power and status are analytically separable and may be specific to given activities, we may follow Brown's (1965: 73) proposition that power and status are generally associated in order to derive general propositions across a range of activities, and examine the outcomes of differences in status in Heider's theory.

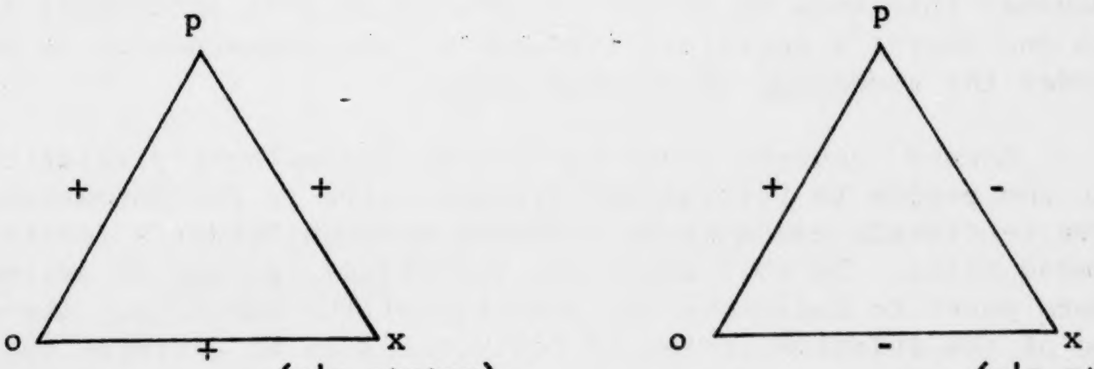
Where the individual p has a superior status to the other individual, o, and each individual is positively disposed toward his own status and neutral or negatively disposed toward the other status, the balanced state is negative; p will tend not to like o, and o not to like p (Fig. 3).



(p's status) (o's status)

Figure 3

However, where the individual who occupies the inferior status is positively disposed toward the superior status and negatively disposed toward his own, the disposition between p and o will tend to be positive (Fig. 4).



(p's status) (o's status)

Figure 4

This latter case might be expected where it is possible for the individual who occupies an inferior general social status, or a status in a particular activity, to become disassociated from that status and acquire the superior status. It may be expected to occur less frequently when the inferior status is consistently ascribed, or is inescapable, as in the case of an ethnic membership or sociocultural membership. Heider's requirements for a balanced state, therefore, appear to support the relevance of the relative status of individuals for the formation of dispositions and the importance of equality of status and power for the formation of positive dispositions. Though again, he indicates that equality of status may not be a necessary condition for them to occur.

The chief difficulty with Heider's formulation of balance theory is the derivation of predictions as to the outcome of interaction from the several independent variables which may be conceived to be identified with the interaction. An interaction can be conceptualized from the point of view of each individual's disposition toward the other, or each individual's disposition toward the activity, or each individual's disposition toward the goal of the activity. The individual's disposition toward any one of these factors may, for that individual, be of more or less importance to him, and thus influence or not influence the formation of his disposition toward the other individual. Each possible independent variable is contingent upon each of the other variables. Thus it is not possible to predict outcomes from different conditions of interaction unless the values of the individual are first obtained.

From the cognitive dissonance theory of consistency developed by Festinger (1957), a further set of variables can be related to the development of positive dispositions between individuals engaged in interaction.

This theory is concerned with the relationship between an individual's cognitive elements, which include his beliefs, values, and attitudes, and his ongoing behavior, and proposes that there is a tendency for cognitive elements and behavior to move toward a state of consonance or agreement or consistency from a state of dissonance, disagreement, or inconsistency. The direction of causation between cognitive elements and behavior is, as in the other theories considered, two-way; ongoing behavior may bring change in cognitive elements and vice versa. But a central postulate of this theory is that cognitive elements will form and change in order to become consistent with social and physical reality.

> The reality which impinges on a person will exert pressures in the direction of bringing the appropriate cognitive elements into correspondence with that reality (Festinger 1957: 11).

The individual's behavior is a particularly salient and influential factor in the determination of the reality which is experienced by the individual. It is at once a part of the reality, and functions to bring about relationships between the behavior and cognitive elements and relationships between the individual's different cognitions. These relationships between behavior and cognitions and cognition and cognition in turn form the basis for the state of consonance or dissonance experienced by the individual.

Behavior acts as an independent variable to modify existing cognitions when the behavior is discrepant, at variance from or contradictory to them. Any discrepancy between private belief and public behavior will induce dissonance and thus set up a state which can be resolved only by changes in behavior or changes in cognitions. Such discrepancy may be expected to be salient to the individual where the discrepancy is perceptible to other individuals known to him, that is, becomes public knowledge. Where the individual is constrained by any means to continue the behavior, the behavior can be expected to remain invariant and the resolution of dissonance takes the form of change in the cognitive structure of the individual. Hence, the constraint of an individual in a given behavior and the public perception of the behavior, when acting together, can be expected to modify cognitions toward consistency with the behavior. The condition of behavior in which there is a constraint and the public behavior is at variance with the individual's private cognitions, is termed forced compliance.

The general proposition that forced compliance will bring about attitudes consistent with the behavior can be expanded to identify the conditions of constraint under which dissonance, and hence attitude change, can be expected to be greatest. When the constraint is associated with a high reward for the individual, he may perceive the reward to be sufficient to justify participation in behavior at variance with his private attitude; similarly if the constraint is imposed by force he may be able to reconcile his behavior and attitudes without modifying his attitudes. The type of constraint upon behavior which is most likely to result in attitude change, therefore, is that which is not associated with a high degree of either compulsion or reward.

Empirical support for these several conditions of forced compliance is afforded by a number of studies. The findings of Deutsch and Collins (1951) of opinion change in an interracial housing settlement are interpreted by Festinger (1958: 121) to indicate that conformity to public laws and social policy, or more generally, social norms, will induce changes in opinion. Keleman's (1953) evidence of opinion change with seventh grade students under conditions of high, moderate, and low rewards supports the hypothesis that compliance in the low incentive condition produces the highest degree of opinion change.

The constructs in dissonance theory are behavior, disposition toward the other, and reinforcement. The theory does not provide explicit conceptualization of the distinctions between negative or favorable activities, between equal or different status or authority positions within the interaction, or of the relation between the interaction and the individual's achievement of goals. The implicit relationships between the variables and the formation of dispositions is a matter for inference as to their effect on the individual mediated by the rewards or punishments associated with the activity. In the experimental applications of dissonance theory, high rewards have been specified as those which would not normally be considered to be usual outcomes of the activity, but would be regarded as exceptional, a factor which makes the subjective analysis of the consequences of the degree of pleasantness of the task, or the desirability of the goal the more difficult.

The central proposition of cognitive dissonance theory as it relates to the situation of interaction between individuals is that when individuals are required to conform to a pattern of interaction which varies from their private dispositions toward interaction, and the pattern of interaction is perceived to persist through time, the dispositions of the individuals will change to conform to the behavior displayed. This change in dispositions will be greatest where the consequences of interaction for the individual are seen to be neither highly rewarding nor highly aversive.

The experimental application of the forced compliance formulation of cognitive dissonance theory to the problem of defining those conditions of interaction which can be expected to induce the formation of positive dispositions between individuals requires interaction in which individuals will display behavior which they and their observers will perceive to demonstrate favorable dispositions toward one another, and interaction which is neither exceptionally rewarding nor exceptionally aversive. Further, the interaction conditions must be such that the behavior demonstrated is not consistent with, or would not normally be predicated upon, the attitudes of the individuals toward one another.

The interaction between students from different sociocultural groups in a school can be conceptualized as interaction which is constrained by and required by the school's social structures. These structures require students to associate in the behavior settings provided by the classroom, sports teams, living groups, and the more informal settings provided in the playground. In these settings students are aggregated by the application of different forms of recruitment into interacting groups. Recruitment into classroom settings, sports teams, and living groups is often prescribed by the school authorities, while recruitment into informal groupings is brought about by students on the basis of their own choice. Within the aggregations created by school authorities, constraints upon the formation of groups within which interaction between individuals takes place may vary, from the ascription of close interaction between particular individuals to the complete absence of prescription upon interaction. The form of interaction which takes place, and the cultural mores which are related to it, may also vary from behavior setting to behavior setting and across the aggregations or groups of individuals in which interaction occurs. The social norms which tend to regulate interaction will vary also in the degree to which they are prescribed by the school authorities or evolved by the students.

While the constraints placed upon the persons in interaction, the settings in which interaction occurs, and the cultural mores which regulate interaction will vary from situation to situation in a school institution, the school-student role implies that the individual complies with them. In the formal classroom settings, the recruitment of students into aggregations and into interaction units, and the cultural mores which regulate interactions, are under the direct control of school authorities. These settings represent a relatively high degree of constraint upon the individual and therefore, of compliance by him. Mores of work orientation, amity between individuals, helpfulness toward other individuals, and friendly competition between individuals within the context of work activities can be expected to be common characteristics of classroom settings. Within the classroom, these mores are applied directly by school authority as represented by the teacher.

Thus, the interaction between students in a classroom is explicitly conceived of as taking place under a condition of the forced compliance of individuals to the social and cultural restraints imposed by the school authorities.

Participation in interaction in the school-student role in the classroom can be expected to imply different degrees of rewards or punishments to the different individuals in any class depending upon their motivation toward the rewards associated with being a satisfactory student. However, the rewards and punishments associated with compliance in this role can be expected to have a relatively stable structure for the individual and to vary across a relatively stable range of approbation and disapprobation on the part of teachers. Rewards of attaining the good opinion of teachers, or punishments of attaining the bad opinion of teachers may be expected to represent the ends of this relatively stable range. Additional rewards in the form of promotion, special recommendation by the teacher to the headmaster, absolving the student from the normal requirements of classroom attendance or from normal duties, or additional punishments in the same manner, can be regarded as exceptional or unexpected. Participation in classroom interaction in which the rewards and punishments are those to be expected within the range of approbation and disapprobation associated with the teacher in the classroom is considered, therefore, to demonstrate forced compliance in the form of normal, but not high or low rewards or punishments.

The students' perceptions of the favorability or unfavorability of the interaction activity in which they are engaged, and of the relationship of this activity to the attainment of their individual goals are identified as variables in Homans' formulation. They are implicit rather than explicit in the conception of interaction developed here. The students' participation in interaction in the classroom is in the context of the performance of schoolwork, which is inferred to be both a positive activity and a positive goal for the individual student.

These conditions of interaction in the classroom can be expected to arouse cognitive dissonance, and hence sentiment change, where the private opinions of the students vary from the public behavior to which they conform. Where the individuals in the classroom are drawn from groups which are evaluated differently, and the individuals are influenced by standards of appropriate interaction behavior which are at variance from the cultural mores affecting the interaction behavior permitted in the classroom, dissonance can be expected to arise. In this study, the evidence from the socialization of students, and from the traditional, social and cultural values which regulate interactions between the members of the different social and cultural groups (Chapter III) is presumptive evidence that the demonstration of close association, amity, and peaceful cooperation between individuals from the groups can be expected to produce dissonance. Since the private opinions can be expected to indicate the appropriateness of less favorable behavior than is demanded by the classroom, the dissonance can be expected to produce positive attitude change.

Within the classroom different forms of interaction can be expected to demonstrate different degrees of positive behavior between individuals. Mere contiguity between individuals under classroom constraints can be conceived of as promoting a low level of favorable interaction where contiguity is not consonant with cultural mores. A higher degree of favorable interaction can be expected to follow where the frequency of interaction and the range of activities in which there is interaction is increased provided the outcomes of the interaction are interpretable as demonstrating favorable behavior.

The definition of the forms of behavior which are associated with a favorable outcome on the part of the individuals in frequent interaction is assisted by the theoretical formulations and empirical studies referred to above. These may be cast into a dissonance framework.

Where the satisfaction of one individual's goal precludes the satisfaction of the other's, the interaction can be classed as competition, and the interpretation of the behavior by at least one individual is that it is unfavorable. Where the competition is unresolved, the behavior can be classed as conflict, and both individuals are likely to consider the behavior to demonstrate an unfavorable attitude. Where the outcome of interaction is the achievement of a common goal, whether attained by independent activity or cooperative activity, the interaction is associated with the formation of favorable attitudes between the individuals, and where the outcome is a group goal which requires cooperative activity, the attitudes formed are yet more favorable (McDonald 1965: 540).

Interaction under both of these conditions can be considered to demonstrate a higher degree of interaction than is to be found with contiguity and to demonstrate a higher degree of positive behavior toward others. Interaction directed toward group goals, which precludes independent individual behavior, can be held to demonstrate the higher degree of favorable behavior.

These three types of interaction are conceived to represent degrees of conditions which will arouse cognitive dissonance, and lead to the resolution of dissonance through the formation of positive attitudes between those engaged in the interaction. Contiguity is assumed to be associated with the least degree of dissonance, and interaction directed toward a group goal, the greatest.

With the classroom as the social context, members of different sociocultural groups in New Guinea as the subjects, and cognitive dissonance constructs as the theoretical framework, the following general hypotheses are proposed for investigation.

(1) Students who are able to exercise free choice of the students with whom they interact and therefore do not interact with members of other sociocultural groups under conditions of forced compliance will show relatively smaller degrees of positive attitude change than students whose interaction with members of other sociocultural groups is prescribed by the school.

(2) Students who are required to interact with members of other sociocultural groups, and therefore interact under a forced compliance condition, will show a greater degree of positive attitude change than students who are able to freely choose the students with whom they interact, and a lesser degree of positive attitude change than students who are required to interact to a greater degree.

(3) Students who are required to interact with members of other sociocultural groups in activity directed toward a common goal, and therefore interact under a higher degree of forced compliance and demonstrate more favorable behavior toward their associates than students who exercise free choice of associates or who are required to associate with others in the absence of this condition, will show a greater degree of positive attitude change than the students who interact to a lesser degree.

These hypotheses are investigated experimentally through the formation of three groups of students. The Control group is composed of students in the non forced compliance condition; the Treatment I group is composed of students in the forced compliance condition with no specified conditions of interaction, which can be termed the contiguity condition; and the Treatment II group is composed of students in the forced compliance, interaction directed toward a group goal, condition.

The following experimental hypotheses are set up for comparison between these groups, to be evaluated by means of an analysis of variance of the observed changes in attitude.

1. Positive attitude change in the Control group will be less than positive attitude change for the Treatment I and Treatment II groups:

   H_0: $U \text{ control} \geq \frac{U \text{ tr.I} + U \text{ tr.II}}{2}$

   H_1: $U \text{ control} < \frac{U \text{ tr.I} + U \text{ tr.II}}{2}$

2. Positive attitude change in the Control group will be less than positive attitude change for the Treatment I group:

   H_0: $U \text{ control} \geq U \text{ tr.I}$

   H_1: $U \text{ control} < U \text{ tr.I}$

3. Positive attitude change in the Control group will be less than positive attitude change for the Treatment II group:

   H_0: $U \text{ control} \geq U \text{ tr.II}$

   H_1: $U \text{ control} < U \text{ tr.II}$

4. Positive attitude change in the Treatment I group will be less than positive attitude change in the Treatment II group:

   H_0: $U \text{ tr.I} \geq U \text{ tr.II}$

   H_1: $U \text{ tr.I} < U \text{ tr.II}$

Chapter III

THE POPULATION AND SAMPLE: STUDENT MEMBERS OF TRIBAL SOCIETIES

The Population

The subjects of this study were drawn from the peoples who inhabit the Eastern and Central Highland areas of New Guinea. The peoples of the highland region are considered by most ethnographers to be divided into two major cultural groupings -- the peoples of the Western Highlands and Central Highlands, and those of the Eastern Highlands. Both share the same major features of social structure, of an economy based on swidden agriculture, of intergroup relations in the form of endemic warfare, of linguistic organization, and they may be grouped together as a single racial category of Papuan (Coon, Garn and Birdsell 1950).

Read (1954), in an early classification of the peoples of these areas based on a limited number of reports, considered there were widespread uniformities in culture and social structure among them, within which it might be possible to identify two principal culture areas separated by a division along the geographical boundary formed by the high mountain ranges which separate the valleys of the Eastern Highlands from those in the west. Recent investigations have affirmed both the overall similarity of these culture areas, and the presence of shifts in blood groupings, language, residence patterns, and ritual practices across the peoples who inhabit either side of this natural barrier (Langness 1964; Bulmer, R. and Bulmer, S. 1964).

Thus, the Chimbu people of the Central Highlands included in this study have languages which are more clearly related to those of people in the Western Highlands than to those of the peoples from the Eastern Highlands; their villages are smaller and show less aggregation of lineage groups; their dress and their fertility rites are distinct from those of most people of the Eastern Highlands. The differences, however, reflect cultural drift rather than sharp cultural division. The Siane people and the Asaro people, placed geographically to the east of the mountain divide, are able to communicate with the Chimbu people, and possess the same fertility (gerua) ritual, though they have a much closer affinity in language, dress, settlement pattern, and ritual with the other peoples of the Eastern Highlands.

A less distinct linguistic (but not ethnic) boundary distinguishes between the peoples of the western and eastern areas of the Eastern Highlands (Read 1950)[1] but this linguistic division is not correlated with other differences in culture; in fact the whole Eastern Highlands area is marked by cultural uniformity. To the east of this linguistic boundary lie the Agarabi, Tairora, Fore, and Gadsup peoples, and to the west the Kamano, Gahuka, Bena, Yagaira, Siane, and Asaro peoples. The location of these peoples is shown in Diagram 1.

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[1] The division is between the Gadsup - Auyana - Awa - Tairora family of languages and the Siane - Gahuka - Kamano - Fore family. Both language families are branches of the same Eastern Highlands linguistic stock (Wurm 1964).

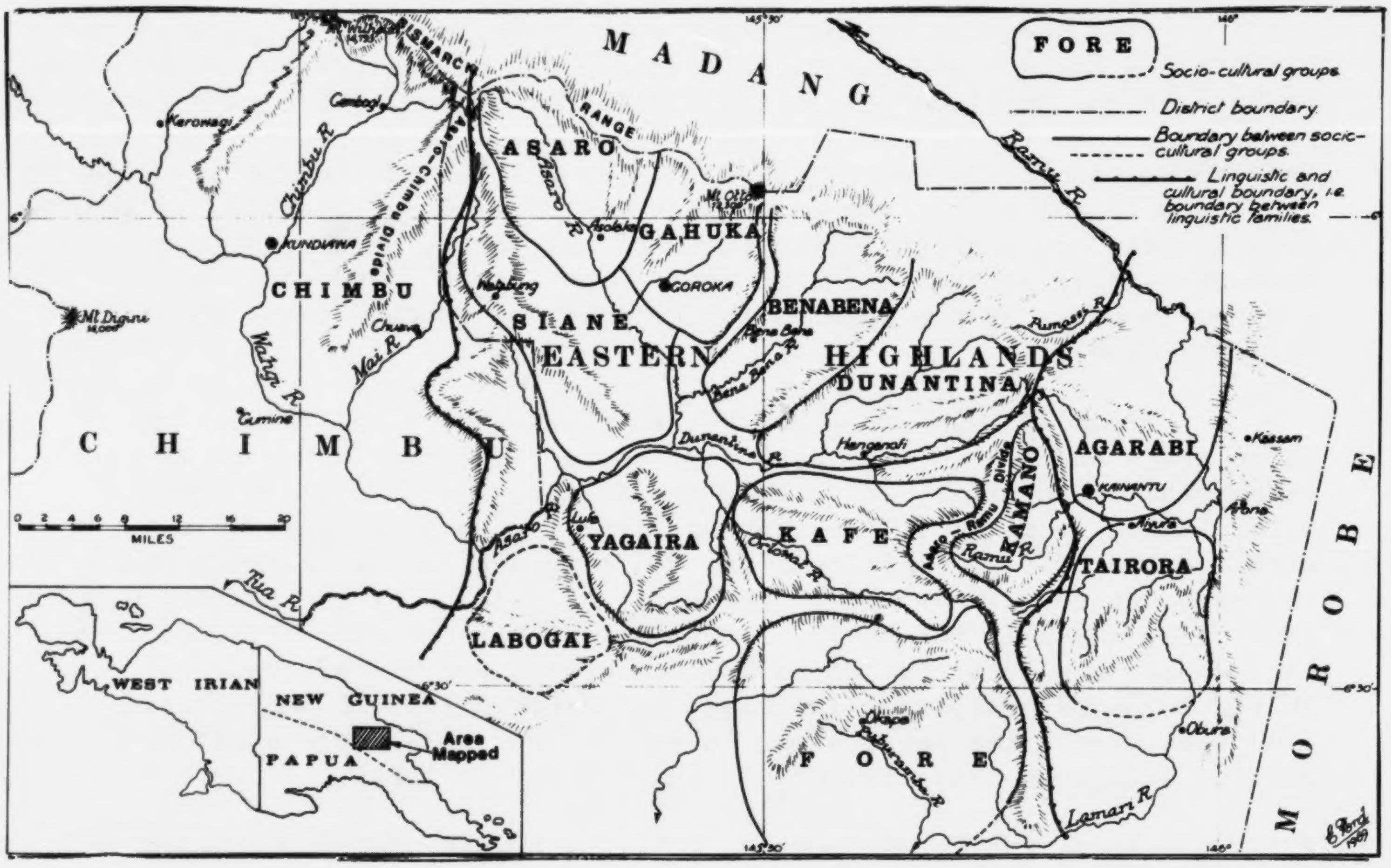

MADANG
FORE
Socio-cultural groups
District boundary
Boundary between socio-cultural groups
Linguistic and cultural boundary, i.e. boundary between linguistic families
ASARO
GAHUKA
GOROKA
BENABENA
SIANE
EASTERN HIGHLANDS
DUNANTINA
CHIMBU
KUNDIAWA
Mt. Digine
CHIMBU
AGARABI
KAINANTU
KAMANO
KAFE
YAGAIRA
TAIRORA
LABOGAI
FORE
MOROBE
Ramu R.
Lamari R.
Wahgi R.
Chimbu R.
Asaro R.
Tua R.
Keroweagi
Kassam
Obura
MILES
WEST IRIAN
NEW GUINEA
PAPUA
Area Mapped

Diagram 1
Location of the Peoples of the Central and Eastern Highlands

The peoples of this region, when viewed from the perspective of cultural evolution, belong to the class which may be typified as tribal as distinct from the class of hunters on the one hand and those social groupings with greater degrees of differentiation and integration which may be termed civilizations on the other. Sahlins (1968: 5) asserts that the major broad characteristic which distinguishes the tribe from civilizations is the prevalence of warfare, a condition in which force is legitimately available to all men, and as a corollary a culture value which is tantamount to a disposition to fight. The disposition toward warfare within and without the tribe is balanced by the efforts of members to establish and maintain safe relations within the kinship structure, relations characterized by cooperation and non-violence.

Within the category of sociocultural organization of the tribe, the peoples of the highlands may be distinguished from other tribal groups of the world by the lack of differentiation and stability attained in the means of social control, and by their limited scale of sociopolitical integration. They lack the hierarchical ranks of social groups and the organized and relatively more stable political institutions of those tribes which are organized in chieftainships.

The highland tribes belong to the class of segmentary tribes. The tribe itself is small, seldom numbering more than a few hundred people. It is divided into smaller, local communities which seldom claim more than a few square miles as their territory, and each is independent in its social, economic and political activities.

The usual structural units of a tribe in ascending order of size are the household, the lineage, the clan and the tribe. As the size of the unit increases, the degree of integration of the parts of the units decrease so that the tribe is often but weakly organized, and at the boundaries of the tribal territory the members of a tribe may develop ties with the members of neighboring tribes. Tribal morality, or the norms which define appropriate forms of relationship between members of the tribe, evidence a related decrease in force and responsibility as the relationships move from those centered in the household to those concerned with relationships within the tribe. Any transaction between individuals or groups is classified as between members of the same household, members of the lineage, clan or tribe, or members of one tribe and members of another tribe. While the regulations which are inherent in kinship enjoin relationships of support and cooperation among members of households, lineages, and clans, they become increasingly neutral when the transactions are between members of different clans. In the absence of kinship relationships in intertribal transactions, the relationships are rivalrous and morality wholly negative. The sanctioned use of force follows the same pattern. Sahlins (1968: 19) observes:

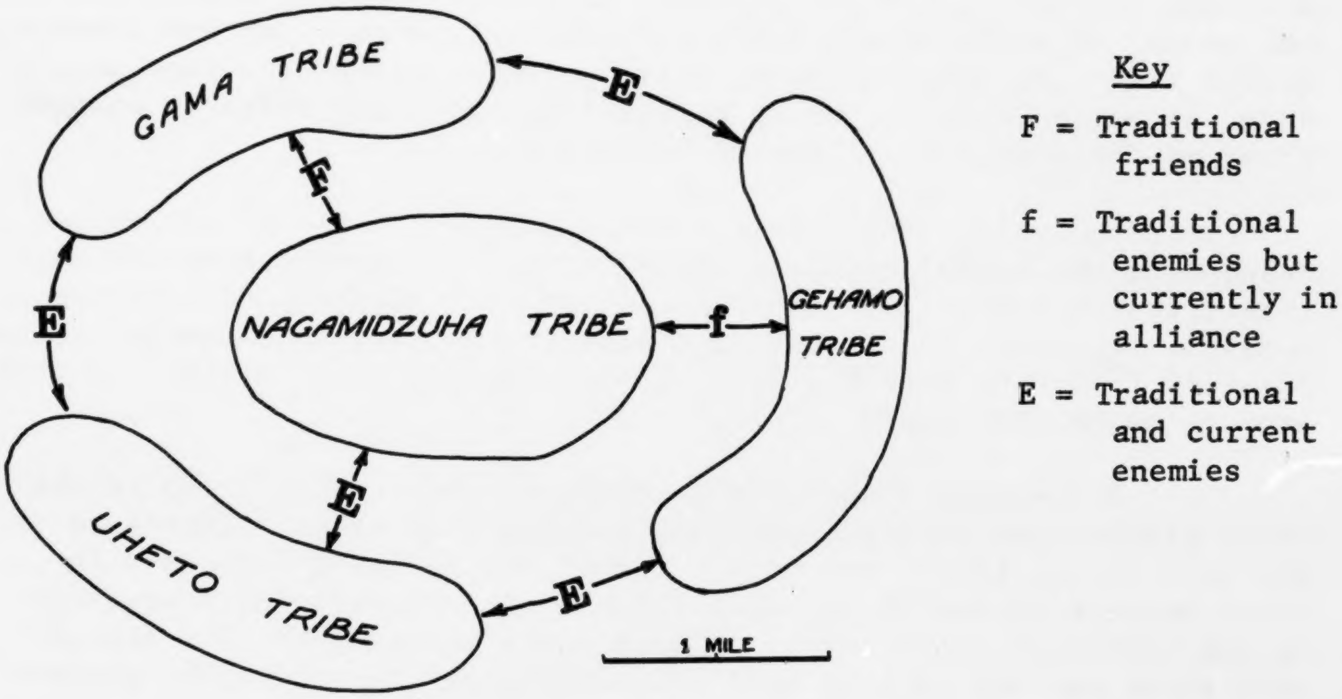
> Weapons of dispute commonly have a segmentary calculus, nicely graded in deadliness in a progression with distance (from the family). Matters should not go beyond heated words in family arguments, and though fists may fly in village brawls and spears be raised in intervillage feuds, the fatal poisoned arrow is reserved for tribal enemies.

Although the segmentary tribe is marked by the lack of integration between segments and social obligations decrease toward its boundaries and those at the periphery of a tribal territory may establish transactions with neighboring tribes, the boundary of a tribe is marked by important distinctions for social relationships. There is a powerful ideology that continuous and unrestrained warfare should not be conducted between clan groups who are members of one tribe, and though disputes within a tribe are frequent, they are constrained by this ideology and a balance between member clans. Marriage ties between the constituent clans of a tribe form a network of ties across the clans of a given tribe, and age grades of initiates from member clans form additional points of linkage between the constituent groups within the tribe. The single name given to a tribe may also express a subjective identification of the members with a tribe and its territorial boundaries.

These general characteristics of the structure, organization, and social control of the segmentary tribe are characteristic of all the peoples from whom the population in this study is drawn. The named tribe of several hundred people is the largest of the political units to be traditionally recognized. The tribe possesses a common name, its members speak the same language, and it has a territorial locus. The specific characteristics of this population with particular focus upon intra- and intertribal relationships can best be described by reference to the works of a number of ethnographers who have studied one or more of these peoples. The major sources for this description are Kenneth E. Read (1951, 1954a, 1954b, 1966), Richard Salisbury (1962), L. L. Langness (1964), Mervyn Meggitt (1964), and reports held by the Lands Title Commissioner, Goroka, New Guinea, on the ethnography of the Keianga people near Kainantu (from an unsigned Patrol Officer's Report, 1957), and on the Asaro people (M. Orken, "Land Tenure Customs of the People of the Lower Asaro Census Division," 1965).

The basic structural units of the highland tribes are the household, the patrilineage of agnates and their affines which seldom exceed twenty individuals, sub-clans made up of lineages, clans made up of sub-clans, and sub-tribes and tribes made up of clans. The patrilineage possesses a known and named ancestor. The sub-clan possesses a common ancestor, often forms a village residence group, holds corporate lands and stresses moral values of unity and amity. The clan usually recognizes a common ancestor (sometimes putative) and does not permit the use of violence between clan members, though it does not require amity within the clan. The tribe is a named group which occupies a recognized territory. Disputes, force, and limited warfare may occur between the clans which constitute the tribe. The tribes of the Gahuka - Gama people (Read 1954a, 1954b) distinguish between a form of warfare within the tribe which was regarded as temporary, albeit fought with the same weapons and by the same methods as intertribal warfare, and warfare between tribes which is considered to be endless. The clan members related to the combatants within the tribe have a responsibility to settle intratribal warfare; their responsibility toward intertribal warfare is to support the members of their own tribe in hostilities.

The named tribe of up to but seldom in excess of one thousand people is the largest of the traditional inclusive units. It is united not by an ideology of common descent (this is limited to the constituent clans) but by the ideology which restricts disputes within the tribe, and supports the waging of continuous warfare with neighboring tribes. Typically a given tribe occupies a territory of several square miles and is surrounded by a number of neighboring tribes, of which all are potentially hostile. At any one time alliances of mutual friendship and support are formed with one or more of these neighbors while a state of continuous warfare exists with others. Over a period of time within living memory of the tribesmen, friendly alliances have changed to open hostility. The pattern of relationships is illustrated in Diagram 2 drawn from Read's (1966: 36) description of traditional relations in the 1950's between the Nagamidzuha tribe of the Gahuka people and the surrounding tribes.



Key

F = Traditional friends

f = Traditional enemies but currently in alliance

E = Traditional and current enemies

Diagram 2

Thus each tribe was engaged in a constant struggle to maintain its own boundaries and to maintain and improve its position of relative strength, determined largely by the number and ferocity of its warriors and guile of its foreign relations. The small scale of the societies placed each tribe in continuous contact with the neighboring tribes.

Although intertribal warfare has been put down progressively by the administration in the areas closest to the main settlements for a period of up to twenty years, the traditional relationships remain valid in the minds of the people. The author stood in a village of the Bena people five miles from the Administrative Headquarters of the Eastern Highlands in late 1968 accompanied by a Bena teacher trainee born in 1948. In reply to a question of who lived in the villages visible on hilltops no more than three miles distant, the student pointed out the areas of three surrounding tribes, named each, and volunteered that two of them were enemy tribes, while the third was friendly. High school students questioned about their neighboring tribes frequently volunteered that they were considered to be enemies, or were currently friendly as the case may be.

Other major factors which contribute to a sense of the identity of the tribe are the possession of a common language, a common set of customs (dress, ritual, gardening practices, and food), occupancy of a common territory, and the capacity to settle disputes within the tribal group. Linguistic and cultural identity, however, is not confined within the tribe since adjacent hostile tribes within the same people share a common culture, though slight linguistic and cultural changes occur as the proximity of tribes decreases.

The values and morality into which the child is socialized respond to the tribal nexus of organization, the competitive and hostile intertribal relationships, and the ideology of warfare. The values and morality pertinent to this study of interethnic attitude change can be detailed following Read's (1954a, 1954b, 1966) intensive study of these aspects among the Gahuka people.

A dominant ethos of the segmentary New Guinea tribe is the value placed upon physical violence and aggressiveness. Expressed in the mien of the individual tribal member and in his relations with other members of the tribe, this value attained unbridled expression in the treatment meted out to enemies slain in warfare. The aim of each tribe was not only to kill its enemies and destroy their gardens, but to heap physical indignities upon them when they were slain. Within the tribe the punishment for wrongdoers included public beatings and humiliations, while enemies were often mutilated and their bodies dismembered and consumed. This value, expressed as the desired personality within the tribe, accorded highest respect and status to the fearless and cunning warrior.

The value placed on aggressiveness within and without the tribe is regarded by Read as an expression of a fundamental insecurity in the interpersonal relations between individuals and between groups. At the individual level the people of the highlands are judged to be (Read 1954b: 23):

> volatile and jealous of their reputations, quick to take offense, to resort to quarrelling and accusations of sorcery; indeed the underlying tenor of life is largely one of mutual suspicion and scarcely veiled antagonism.

The morality a man learns is set by his place in the kinship structure of the tribe. The individual is considered largely in terms of his status in the kinship system and views himself and his relationship with others primarily in the same terms. The morality which structures relationships with others is conceived of in the same terms, and an individual's moral obligations to others depend upon their status relative to his. Thus it is wrong for an individual to kill a member of his own tribe, but it is commendable to kill members of opposed tribes. Should a man from another tribe be related to a man through marriage, then he should avoid killing him in battle, but this injunction does not apply to members of the man's clan who are fighting beside him. All relationships outside the tribe are at best formal, and frequently hostile. The child learns this gradation of morality throughout his life and with special intensity at the times of his initiation and of his seclusion with age mates which follows, so that in traditional times a youth of sixteen might have begun to acquire a reputation as a formidable warrior.

An institution within the tribe which established solidarity among member clans, and a form of relationship between youths additional to those of kinship is a system of age mates. Boys within an age range of approximately five years are initiated together and henceforth maintain relationships of obligation and of equality to one another, and are expected to enjoy companionships as equals. This supportive, equal status relationship contrasts with the inequality of status and authority established by virtue of age. Boys who are older are regarded as of higher status and have the right to control the behavior of those who are younger, though this right is constrained to authority over the behavior of the younger boy which accords with tribal morality and is tempered by the older boy's responsibility to assist and protect the younger. In this relationship, however, the duty of the younger is to obey and the right of the elder is to command.

The relative importance of kinship and the institution of age mates as principles which influence the association of people within the tribe is summed up by Read (1954a: 227) in his discussion of the freedom of individuals to choose their associates and structure their relations with them.

> His attitude toward others and his possible relations with them are defined by his own position and theirs in the social pattern, so that while he may feel more strongly attached to one of his age mates rather than to another, and while he may choose to make this man his special friend and confidant and to live and work with him, he can exercise his preference only within a particular category of people. (Author's underline)

Male-female relationships are affected by the situation of endemic conflicts between tribes, the structural proscriptions upon intra-clan marriage which require men to acquire wives from other clans within the tribe or from other tribes with which an alliance has been formed, and by a complex of beliefs in male superiority which is combined with a belief that contact with women is inherently dangerous to a man's physical strength and may provide opportunity for the exercise of sorcery motivated by desires for revenge by her tribe or clan of origin. Emphasis on these aspects varies from tribe to tribe within the highlands; however, the facts of male superiority and dominance and of the potential danger of contact with females are universally recognized (Meggitt 1964).

The separation of boys and girls into play groups occurs before puberty. At initiation boys are secluded from women, and though interrupted through the months or several years of courtship in which the young initiated men of a clan visit prospective wives, segregation is resumed in the traditional village in which men reside in the men's houses while women live in separate households. The male ideal holds that man is the superior and dominant creature, and women are at best second-class citizens, though a necessary evil for the propagation of the tribe. While this ideal of male superiority is threatened by the belief that women are able to bring about injury to a male, the measure of power accorded to females by their potential danger does not promote the greater association between the sexes which might be suggested by a closer equality. On the contrary, this belief strengthens the tendency to separate the men and women into exclusive solidary groups.

The traditional tribal institutions and cultures bring about a number of barriers to the relationships between their members. The most dramatic of these is the division of people into membership of the groups which may be subsumed under the tribe -- groups within which warfare is prohibited and different degrees of solidarity and support are required -- and into membership of other tribes. These are potentially or actually dangerous and must be regarded with suspicion and hostility. Within the tribe the individuals' relationships with others are structured by the principles of kinship, of age, the age grade system, and the inequality and suspicion between the sexes. Each prescribes the boundaries of associations which may be regarded as supportive and of equal status.

Since the beginning of regular contact between these traditional cultures and the west (for periods no longer than twenty years) the people have responded to a number of new conditions. Perhaps the most significant of these has been the prohibition of warfare and the establishment of external means of social control, by police, a western legal apparatus, and appointed tribal leaders. These changes have affected the major condition of life of the segmentary tribesmen -- the situation of continuous, endemic intertribal warfare. A system of roads and tracks has been established to afford tribesmen safe passage from one part of the highlands to the other, thus increasing the degree of contact between them. Christian missions, through their teachings and example, have attempted to discourage hostility between the sexes, an index of their success being the closer association of men and women in the villages and the disappearance of the separate men's house in most villages. Missions and Government have gradually established a pattern of elementary and high schools which draw a small proportion of children[1] from the villages and from participation in the traditional socialization processes. In the last ten years local government councils which overlap the boundaries of erstwhile traditional enemies have been established and the highland population has twice elected representatives to the central government for Papua and New Guinea.

Certain of the changes which these forms of contact have had on the structure and ideology of tribalism in the highlands can be identified, although there is a marked dearth of studies of change among these communities compared with the detailed ethnographic study of traditional society.

Contact and transactions across the traditional tribal boundaries are now less fraught with physical danger to the individual or to the tribe. Through work for the government in the locality or for distant plantations on the coast, a large proportion of men and youths have experienced relatively safe contact with other tribesmen and come to compare the culture of their tribe with that of distant groups. The introduction of Pidgin English has established a means of ready communication between the peoples whose mother tongues are incomprehensible one to the other, and this language is widely used for the more formal intercourse of work and administration when men from different areas are brought together. The values of group prestige and aggression toward others are maintained but can no longer find an outlet in physical violence toward other tribesmen and must find alternate means of expression through ceremonial displays, competition for conspicuous wealth, and competitions in the form of "football games" which limit the conflict from the decimation of gardens and people with weapons to the infliction of physical injury with fists.

For those children who do not attend schools, the forms of socialization have not changed but the incitement to prove their status by raids against the enemy has been dulled. Those who do attend the elementary schools have experienced several years of contact with the youth of other tribes, but not with other peoples, under the protection of their schoolmasters. The small proportion of children who attend a secondary school (less than 10 per cent of the age group) spend years separated from their tribesmen, are excluded from formal initiation practices, and experience contact with children drawn from other tribes and peoples of the highlands.

But the effect of these changes upon the culture of tribalism as it affects the identity of the individual and the values and morality which he brings to the potentially wider field of social contacts available to him are less readily apparent. Read's description (1966: 141-150) of a recent initiation ceremony among the Nagamidzuha tribe of the Gahuka prople provides some insight into the scope and type of changes in socialization. Describing a group of adolescent boys he knew from daily village contact, Read observes that while the boys did not show regret that they had not been tested in warfare, they listened with intense interest to the elders' enthusiastic recital of heroic deeds. For them, the opportunity to be feted as successful warriors came from "games" of football between feuding groups.

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[1] Enrollment in the highlands has increased slowly since the late 1940's to 20 per cent of the school-age population.

> These football games were not mere sport but a substitute for feuding . . . feuds were instigated by acts of adultery, the theft of pigs, or by homicide, and unlike rova, the interminable hostility associated with enemy groups, the fighting ended when the injured party had redressed the wrong. . .

During the encounter, which occasionally lasted several days, the numbers on the opposing teams fluctuated sharply: at critical moments, as many as thirty men on each side might face each other. The team representing the offending group entered the fray with a score of one in its favor, standing for the act that had to be redressed (Read 1966: 150-151).

The direct contact of these youths with traditional inter-tribal warfare has ceased, but they are still exhorted to observe the values of aggression and hostility toward these groups. Violence in intra-tribal disputes, though encouraged and a condition of the individual's social prestige in his group, has been muted in expression from bows and arrows to the use of arms and legs as weapons.

The traditional identity of the individual at its most inclusive level was rooted in his membership of the named tribe. Beyond this level lay men who were strangers, and being strangers, they were also enemies. For example, the Nagamidzuha tribe is one of twelve tribes of the collectivity named by anthropologists the Gahuka-Gama. Together the tribes number approximately 5,000 people. Though no common name was given by the tribesmen to this larger collectivity, they perceived it as a cultural entity, with common language and customs, and a territorial entity. The surrounding peoples, the Asaro and the Bena, were regarded by those Gahuka who had contact with them as being different, as well as being enemies, whereas other Gahuka tribes, though identical in these respects were also enemies. Traditionally, then:

> the existence of similar forms of organization and of identical traits amongst their neighbors are less important to the Gahuka than a few conspicuous differences, and that, conversely, similar differences within them are subordinated to a concept of cultural commonness (Read 1954a: 35).

The Gahukas' perception of other groups can be generalized to a people's traditional perception of their neighbors throughout the highlands, as the same observations are made by Read in discussing the peoples of the eastern section of the Eastern Highlands (1954a) and by Salisbury (1962: 23) for the Siane people.

Ethnographic evidence suggests that, as a result of the wider contact between tribesmen in recent times, the perception of the unity of the cultural group and of differences between cultural groups has sharpened. Among the Siane in 1953 the radius of safe movement of the people from the 16 Siane tribes was only 20 miles, yet Salisbury (1962: 23) reports a growing consciousness of their identity as a unit:

> The Siane have recently begun to differentiate themselves as a people from other surrounding groups and to have some feelings of group identity.

In the last 15 years contact between these previously isolated groups has increased in space and in scope as centralized markets, employment on the roadworks, in agriculture, and with the Administration has drawn the peoples into contact, and the Mission and Government education systems have placed students from different peoples into long-term association by virtue of residence at the schools.

Empirical evidence of the validity of the identification of high school children as members of these sociocultural groups was gathered for this research project. Students in the Goroka High School were asked to respond to a series of open-ended questions:

1. What is the name of your village? ______________
2. Do you have a big name for your tribe? Yes No Don't Know
3. What is the big name for your tribe? ______________
4. Is your tribe part of a bigger group of people who are like you? Yes No Don't Know
5. What is the name of this bigger group of people? ______________

In a later section of the questionnaire students were asked to select the name of their larger group from a list.

The complete positive response to item 4, and a 97% response with a name for item 5, indicate the existence of an identification with this larger sociocultural group in addition to the individual's identification as a tribesman. Responses to item 5 were mostly in the form of a name for the larger group, e.g. Chimbu, Gadsup, and sometimes in the form of the name of a town or center in the area inhabited by the people e.g. Watabung, Kainantu. Responses to the same items in other high schools in the Goroka area indicated the same readiness of students to volunteer their membership of a supra-tribal group. Items which required individual students to name the people of their school associates drew an almost complete identification of sociocultural groups.

These lines of evidence indicate that a sociocultural group identification is emerging among the adult village population at large and has emerged among the population of secondary school children in the area who have experienced day-to-day association with a large number of these groups. The names given to these groups coincide with the names with which they are identified by Read (1954a), which are based on a sociocultural classification and originally based on criteria as diverse as the name given by the people to their language (Agarabi), the name given by the people to one of the larger tribes (Fore, Gahuka), the common term used by the people of the sociocultural group for their greetings (Siane), or the name given by the people to a landform (Asaro) or to the area which they inhabit (Chimbu).

The denotation of these names include, then, a sense of cultural similarity between the peoples with components of language, dress, gardening practices, ritual and magic, and sharp recognition of the culture differences of other named groups; a recognition of social differences in that people so classified must stand in an extra-tribal relationship which in traditional terms means a classification as potential enemies; and a territorial identity among those who share the same grouping and difference from those who belong to another group. Membership of different groups automatically denotes the lack of social solidarity which is found in the sphere of the tribe, but shared membership of the same group does not indicate the presence of any particular form of close solidarity. For, as the discussion of tribalism above indicates, the members of a sociocultural group may be members of the same tribe, and hence supportive to one another, members of tribes in temporary friendly alliance, or members of tribes which are traditional enemies, and hence hostile to one another.

For four reasons, the classification of individuals as a member of one of these sociocultural groups has been adopted in this study. First, there is empirical evidence that in the social context comprised of individuals from different sociocultural groups, the tribal individual identifies both as a member of a tribe and as a member of a cultural group. Secondly, the relationship between members of different sociocultural groups denotes constant dimensions of relationship. Such a relationship is always between members of different tribes and different cultural units which implies a traditional relationship of hostility and complete social independence, whereas a relationship between members of different tribes could imply variously traditional enmity, or a traditional alliance, traditional social independence or traditional relationships through intermarriage. Thirdly, a sociocultural identification is emerging whenever people from different areas are coming into contact in the broader institutions in New Guinea society and can be expected to play an important role in the relationships between people in the society. Fourthly, the small population of tribes, together with the dispersed recruitment of students into the high school, means there are very few students who are drawn from the same tribe. Hence students must associate with students from other tribes, whereas, with the exception of a few individuals drawn from coastal areas of Papua and New Guinea, students are able to choose to associate either with others from their own sociocultural group, or with students from another sociocultural group.

The units of analysis for this study may now be defined more formally and concisely. The individuals in the study are adolescents drawn from the segmentary tribes of the Papuan ethnic group of the Central and Eastern Highlands of New Guinea.

The individuals are classified as members of sociocultural groups, each made up of a number of tribes. The boundaries of these groups correspond with linguistic, cultural, social and territorial boundaries recognized by the people and by ethnographers. There is an ethnic correlate with the sociocultural groupings only for the groups designated as Chimbus, who are drawn from the Central Highlands, and the groups drawn from Papua and the New Guinea coast. The ethnic correlate for the Chimbus as identified by anthropologists is a minor difference in genetic structure between them and the groups from the Eastern Highlands which does not produce any obvious outward physical differences between these people and those of the Eastern Highlands (Bulmer, S. and Bulmer, R. 1964). The ethnic correlate for the Papuan and New Guinea coastal people is associated with obvious physical differences. Papuans have a lighter skin and straighter hair than Highlanders, and New Guinea coastal people have lighter skin. These peoples are classified within the distinct ethnic group, Melanesian. The majority of individuals are drawn from the ethnically homogeneous Eastern Highlands population.

The traditional, and primary, identification of these individuals is as members of the face-to-face named clan, and as members of a named tribe, a unit seldom in excess of 1,000 people. Their emergent identification is as members of a named sociocultural group which may vary from a modal grouping of several thousand people to a group in excess of 50,000 people (the Chimbu).

The Experimental Sample

The site of this study was chosen from the several culture areas of Papua and New Guinea on the basis of the following criteria which are designed to maximize the generalizability of the findings and the validity of the measurement techniques. A large and relatively homogeneous culture area was sought so that cultural factors, which could not be systematically sampled short of sampling from the entire Papuan and New Guinean population, could be specified for the population within the study. A culture area for which there was in-depth ethnographic study was sought for the same reasons. Secondly, this population should be served by a large secondary school which drew students from dispersed cultural groups within the area to provide the numbers of students required to enable results to approach statistical significance, and to support the generality of findings. Thirdly, the area should be served by other high schools to provide culturally similar samples of students on which measurement instruments could be designed and pretested.

Two school sites in Papua and New Guinea satisfied these criteria: the Goroka High School situated in the Eastern Highlands, and the Madang High School, situated on the central North Coast of New Guinea. Both sites were inspected and offered similar scope for research. The Madang High School population, however, was under study in a curriculum research project which involved subject matter in interethnic relations. Since the content and procedures for this research were judged by this experimenter to be likely to contaminate this study, Madang High School was eliminated as a potential site.

The Goroka High School is a government, co-educational boarding school which draws its students from the Central and Eastern Highland areas of Papua and New Guinea. It is located on the outskirts of the town of Goroka. Three other secondary schools are located at several miles distance. The Goroka Technical School is a residential government secondary school for boys who do not qualify for admission to the high school, and enrolls students in a two-year technical course. It is three miles from the Goroka High School. Kabiufa is a Seventh Day Adventist Mission high school, co-educational and residential, and situated seven miles from the township of Goroka. Asaroka, the third of the high schools in the Eastern Highlands, is a Roman Catholic Mission residential, co-educational school, fourteen miles from Goroka. All four high schools draw their students predominantly from the Eastern Highlands, though the mission schools have slightly higher proportions of students from other highland and coastal areas. Students from the mission schools and the technical school were used in different phases of the construction of measurement scales. There is no regular formal contact between the students of these schools, and informal contact between individual students is confined to casual contact between students whose homes are in the same area who meet in the township on Saturday morning on the few occasions when they are permitted to leave their schools. Contact of this type is confined to students from the government schools on the outskirts of the town.

Goroka High School is situated on 23 acres of gently sloping land four miles from the center of the township. The classrooms, two student mess buildings, dormitories and workshops, are sited to utilize most of this area and to provide separation between the dormitory areas and the classroom blocks. Adjacent classrooms are used by classes of the same grade, except that one Form Two classroom is located in the block occupied by Form One classes. One of the Form One classes has no permanent location, but moves to several classrooms throughout the school day. Two girls' dormitory blocks are situated in the southwest corner of the school. They are surrounded by a high wire fence in which the gate is locked at night. One block of boys' dormitories is located in close proximity; the other is two hundred yards to the north.

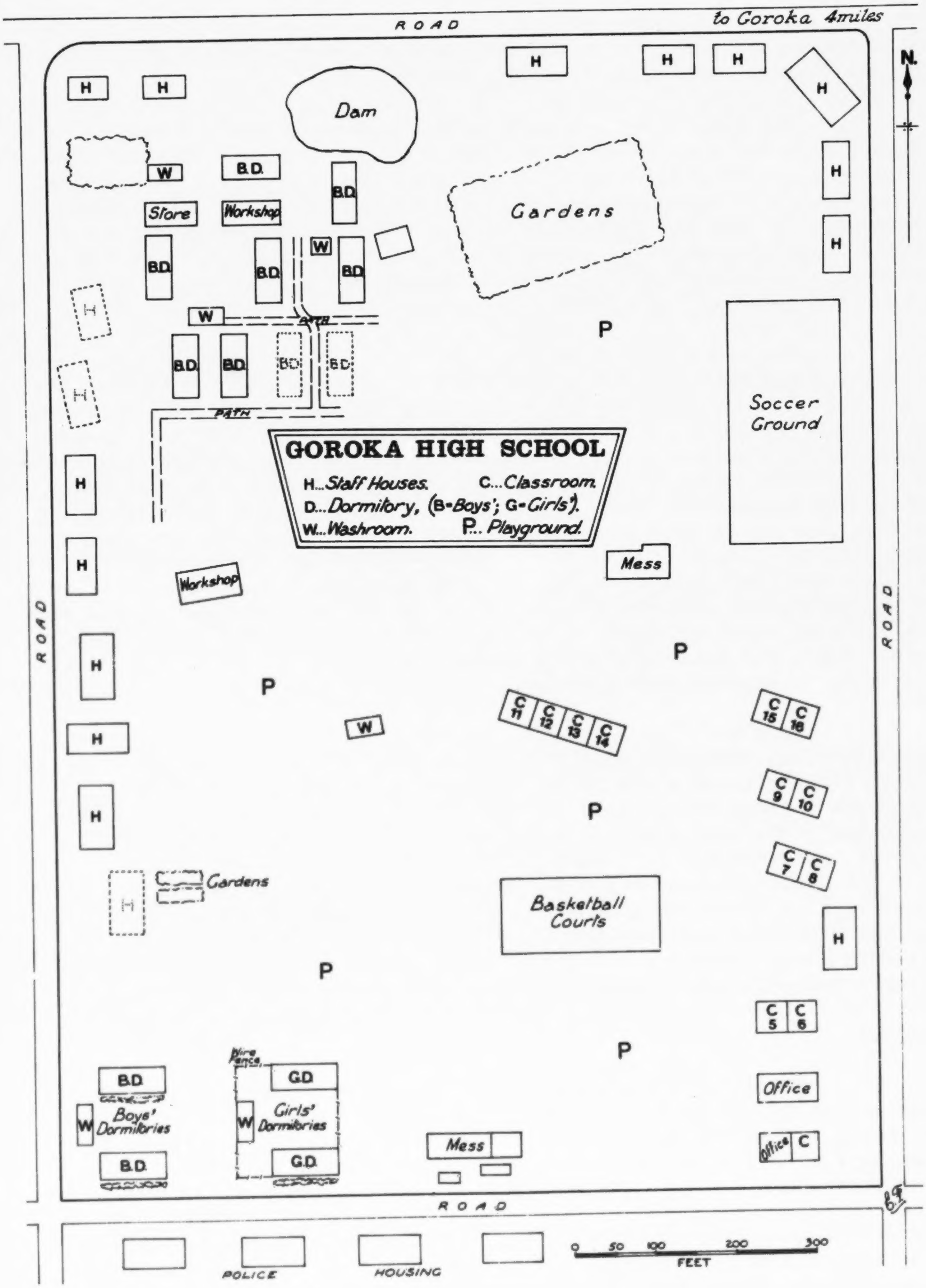
The proximity of a boys' dormitory to the girls' is one reason for the wire fence; the other is to protect the girls from prowlers who occasionally enter the school from the roadway.

The open space surrounding the classrooms and between the dormitories and classrooms forms several large, grassy playground areas which allow wide dispersion of students during recess periods and after school hours. Playing areas for basketball and football are provided. Gardens, for food and crops sold by the school, together with a large dam and pens for poultry, occupy the northern third of the school area. Individual students work their own garden areas in their spare time. The school area is surrounded on three sides by teachers' houses.

The school layout tends to encourage some observable regularities of association in the periods when students are out of class. Girls tend most frequently to be found in groups in the area between the classrooms and the girls' dormitories. Boys move to and fro between their two dormitory areas and the classrooms. In recess times, especially the short morning recess between classes, the areas adjacent to the classrooms are dotted with small groups of students from the classrooms, groups varying in size from two students to perhaps ten or fifteen. The size and composition of the groups remain relatively stable from day to day, and they tend to occupy the same playground space over time. When questioned, the members will say they regard a particular area as theirs, and adjacent areas as belonging to other groups. Sex, class membership, and dormitory allocation appear to be variables which exert pressure on student associations.

Male and female students are allocated at random into four "houses" upon admission to the school. These houses are in turn allocated to particular dormitories and a dining schedule so that the students in each house share the behavior settings of eating and living together. The houses are also the units for informal intra-school sports. Extra class hour maintenance work, which occupies two hours in each afternoon, and organized study for two hours each evening, are organized in classroom groups. School sports teams and the school cadets draw students from the total student body, as do occasional picture shows, debates, and other less formal and regular school activities. Houses, class groups, dormitories, sports, and recreational activities therefore combine students from different sociocultural groups.

Sex divisions are maintained in living quarters and sports activities by the school, and they are maintained voluntarily but strictly by the students at meal times and picture shows when girls and boys occupy adjacent but always separate areas, and almost without exception in their informal recreational groups in the playground. The same division by sex is observable in the classrooms throughout the grades of the school. Any temporary association of a boy and girl in one school desk is almost certainly due to a temporary shortage of space in the classroom. Separation of the sexes in the classroom is


ROAD
to Goroka 4miles
N.
Dam
Gardens
Store
Workshop
B.D.
W
H
PATH
P
Soccer Ground
GOROKA HIGH SCHOOL
H...Staff Houses.
C...Classroom.
D...Dormitory, (B-Boys'; G-Girls').
W...Washroom.
P...Playground.
Mess
Workshop
ROAD
C 11
C 12
C 13
C 14
C 15
C 16
C 9
C 10
C 7
C 8
Gardens
Basketball Courts
C 5
C 6
Office
Office
C
Wire Fence
G.D.
Girls' Dormitories
Boys' Dormitories
ROAD
POLICE HOUSING
0 50 100 200 300
FEET

not required by teachers and results from the choice of the boys and girls.

The formal school organization of students into these "house" and classroom groups enforces the contiguity of students from the different sociocultural groups for twelve hours of each school day from the time when students awake at 6 a.m. to the lights-out signal at 8 p.m. The other two hours are given over to the informal recreation of students during morning recess, the period of the lunch hour not taken up with eating, and a period of one and a half hours between the cessation of afternoon maintenance work and the evening meals. These times, together with the Saturday and Sunday of each week, allow students to contact others from different class and house groups.

Within the formal class and house structures no restriction by the teachers is placed upon the formation of associations by students; each is free to choose his seatmate, bedmates in the dormitory, and close associates in the work teams and sports teams unless a teacher has a particular purpose for grouping students. The classroom behavior, or special skill of the student sometimes leads a teacher to direct a student into a particular group. Sociocultural criteria were not used for this purpose, though occasionally for an errand or a smaller irregular task a teacher might suggest to a selected student that he "find some one-talks" to assist him, thus using a sociocultural frame of reference. With equal probability the teacher might suggest the student "find some mates" to assist.

In general, the formal school organizations established by the allocation of students to "houses" and to classrooms, carried out the conscious purpose of the teachers to place students in contiguity with a representative sample of students from the other sociocultural groups in the school, while it permitted students free choice as to the manner they used this contiguity to structure associations with the other students.

Goroka High School enrolls 482 students of whom 376 are boys and 106 girls, from the ages of 13 to over 20. The modal entrance age for first-year students is 13.5 years. The proportion of students drawn from the sociocultural groups in the highlands is 97.4; the remainder are drawn from Papua and the coastal areas of New Guinea. The proportion of students from the sociocultural groups within the highlands follows closely the distribution of these groups in the total highland population but varies slightly from it to reflect the distribution of elementary schools, feeders to the high school (Table 1). The proportion of each sociocultural group in the total first- and second-year classes, and the proportion of each in the experimental classes are shown in Table 2.

The experimental classes are seen to be closely similar in sociocultural composition to the total first- and second-year population

Table 1

Proportion of Each Sociocultural Group Enrolled in Goroka High School

Sociocultural Group	Proportion %
Chimbu	25.9
Gahuka-Gama	16.9
Kafe-Kamano	15.6
Bena	14.3
Asaro	9.1
Agarabi	7.8
Sina Sina	2.6
Papuan and New Guinea Coast	2.6
Gadsup	1.3
Fore	1.3
Siane	1.3
Other Highland	1.3
	100.0

Table 2

Sociocultural Group	Total First- and Second-Year %	Experimental Classes %
Chimbu	21.4	14.0
Gahuka-Gama	18.6	19.6
Bena	17.1	13.1
Kafe-Kamano	12.4	10.0
Asaro	10.8	8.7
Agarabi	9.3	10.9
Sina Sina	3.0	3.5
Papua and New Guinea Coast	1.4	8.7
Gadsup	1.5	3.1
Fore	1.5	2.2
Siane	1.5	1.0
Other Eastern Highlands*	1.5	5.2
	100.0	100.0

*Labogai, Keanga-Kanite, Tairora, Aiyura of the school. The proportion of Chimbus is slightly lower and the proportion from the Papuan New Guinea Coast and other highland groups is slightly higher.

Goroka High School is staffed by 20 teachers (12 male, 8 female) and a Headmaster. There are three indigenous and 17 expatriate (Australian) teachers. The staff is predominantly young, half the teachers being less then 30, and the other half less than 40, and the modal number of years of teaching experience is three to four years. Three senior masters and the Headmaster have been teachers for more than ten years. In age, experience and ethnic composition, the staff varies little from the average high school in Australian New Guinea. Although the school is used as a center for demonstration teaching for the near-by Teachers' College, excellence as a teacher is not a special criterion for appointment to the school rather than to other high schools.

Teachers are allocated to particular classes as far as possible on the principle that all students in the school should receive teaching of equal quality. Since an average class is taught by approximately ten teachers, each class receives teaching of approximately equivalent quality and is exposed to a variety of styles of classroom control and other teacher-centered influences. Teacher characteristics associated with the indigenous ethnicity of teachers are experienced by all classes in the craft program for each class and the domestic science program for girls.

The staff's experience with previous survey research in the school directed toward the students' perceptions of Europeans, and the youthfulness of the majority of teachers are factors which helped to induce a positive attitude from teachers toward the present research. The previous association of half the staff with the researcher during their teacher education program also enhanced their receptivity toward the project. Their experience as demonstration teachers had encouraged them to adopt a flexible approach to classroom procedures which facilitated the design and operation of the experimental treatments incorporated into the study. Teachers gave freely of their time for group and individual conferences with the researcher throughout, and, because of the demonstration experience, both teachers and students were receptive to the observation of ongoing classroom activities.

The students selected for participation in the study are drawn from the first and second forms of the high school rather than from the four forms. Forms Three and Four were preparing for external public examinations, following which a proportion were expected to leave before the end of the school year. The practical gains of lower expected student loss, the opportunity to follow up this study in later years, and the lesser preoccupation of teachers and students with preparation for employment-oriented examinations, together with the opportunity to use students less removed from their primary socialization were the reasons for this decision.

Of the five Form One classes, three were composed of equal proportions of boys and girls; the other two were composed of boys only. Of the four Form Two classes, three were composed of boys, and one of boys and girls. Because of the importance of a sex dichotomy in association patterns within the culture and within the school, the researcher decided to eliminate the classes in Form One composed only of boys, and the class in Form Two with mixed sexes.

These six classes were stratified into Form One and Form Two so that a class from each form would be allocated to each treatment to give each treatment an equal proportion of students with one and two years' exposure to residential secondary education and to provide an equal proportion of girls to boys within each treatment. The classes were then allocated to each experimental condition (Control, Treatment I, Treatment II) by random sample procedure. Each class was numbered; the first Form One and the first Form Two occurring across a table of random numbers (Dixon and Massey 1957: 369) were allocated to the Control condition, the second Form One and Form Two to Treatment I, and the remaining classes were allocated to Treatment II condition. The mean age for each first-year class was: 1A, 14 years 2 months; 1B, 14 years 0 months; 1C, 14 years 1 month; and for the second-year classes: 2A, 15 years 5 months; 2B, 16 years 1 month; 2C, 15 years 10 months.

The criteria used by the Headmaster to allocate first-year students to the Form One classes were the need to group girls into three of the five classes for purposes of the timetable and the principle of creating classes with a homogeneous learning potential so far as this could be judged from the results of a common academic examination at the completion of the elementary school. The only evidence for a comparison of the learning ability of these classes is from their results on academic performance. There are no standardized tests of intelligence for use in New Guinea schools.

Comparison of these groups on the basis of academic performance in the high school was made by first obtaining a distribution of letter grade scores on mid-year common examinations for each class by combining grades across English, mathematics, science, and social studies. The means and variances for each class were: 1A, $\overline{X} = 2.77$, $S^2 = 1.35$; 1B, $\overline{X} = 2.91$, $S^2 = 1.03$; 1C, $\overline{X} = 2.84$, $S^2 = .90$. $\underline{t}$ tests on the assumption of a random allocation of these students to classes were carried out to provide evidence against the hypothesis that the distribution of scores differed. The value of $\underline{t}$ for the comparison of 1A and 1B is 1.18, a non-significant value beyond the .60 level of confidence; the $\underline{t}$ value for the comparison of 1A and 1C is .64, a non-significant value beyond the .60 level of confidence; and the $\underline{t}$ value for the comparison of 1B and 1C is .64, non-significant beyond the .60 level of confidence. Although this procedure increased the probability that a statistical difference would be shown, evidence for a statistical difference at a conventional level of confidence is not indicated. The statistical evidence is consistent with the results to be expected from a random assignment of students to these classes on the basis of academic performance.

Second-year male students were assigned to classes according to their desire to study elective courses in agriculture, commerce, or technical subjects. Combined letter grade scores (highest grade assigned lower score) of students in these classes for a common school examination in English, mathematics, science and social studies yield the following means and variances: 2A, $\overline{X} = 2.62$, $S^2 = .89$; 2B, $\overline{X} = 2.94$, $S^2 = .77$; 2C, $\overline{X} = 3.28$, $S = .61$. A series of *t* tests to test the hypothesis that these groups do not differ in academic performance reveals that the probability is that the groups do differ. The comparison of 2A and 2B yields a *t* value of 2.9 (significant at the .01 level of confidence) and 2A and 2C a *t* value of 6.6 (significant at the .01 level of confidence). This evidence supports a hypothesis that the groups are unequal in academic performance, such that the performance of 2A is superior to the performance of 2B and 2C, and the performance of 2B is superior to that of 2C.

Since the first and second form students had been allocated to classes two terms before the study commenced, it was impossible to reassign them into classes according to simple random sample procedures to assure the treatment groups did not vary in academic ability. The evidence that the treatment groups differ in respect to academic performance could indicate that they differ with respect to their learning capacity. This possibility poses a threat to the validity of comparisons of treatment effects and will be discussed in a later section of this study.

The proportion in each sociocultural group for each of the experimental groups is shown in Table 3.

Table 3

Sociocultural Composition of Experimental Groups

	Control			Experimental I			Experimental II		
	1A	2A	TOTAL	1B	2C	TOTAL	1C	2B	TOTAL
Chimbu	10	4	14	5	2	7	6	5	11
Gahuka	9	7	16	10	6	16	9	4	13
Bena	1	6	7	5	6	11	4	8	12
Kafe-Kamano	1	6	7	4	6	10	3	4	7
Asaro	4	1	5	6	1	7	8	0	8
Agarabi	4	6	10	4	5	9	3	4	7
Sina Sina*	1	3	4	0	2	2	0	2	2
Papua & N.G. Coast	6	2	8	2	4	6	2	4	6
Gadsup*	3	0	3	4	0	4	0	0	0
Fore*	1	1	2	0	2	2	1	0	1
Siane*	0	0	0	0	1	1	1	0	1
Other Eastern Highlands*	1	0	1	1	1	2	5	4	9
			n = 77			n = 77			n = 77

The proportions in each sociocultural group for the combined control classes, the combined Treatment I classes and the combined Treatment II classes can be compared by means of a chi-square test. After combining those groups marked with an asterisk to yield expected frequencies greater than five, the chi-square value obtained is 5.9, a non-significant value below the .25 level of confidence. This value is consistent with the hypothesis that the experimental groups do not vary from the distribution of sociocultural groups to be expected under the assumption of random assignment of students to experimental groups.

The experimental classes were taught by seventeen of the twenty teachers on the staff. Each class was taught by from eight to ten teachers, not specially assigned to particular classes on the basis of experience or expertise, but assigned by the headmaster to equalize the teacher skill available to each class as far as possible. Eight of the teachers were common to the three experimental groups; six were common to two of the experimental groups; and three of the teachers each taught only one of the experimental groups, a different experimental group in each case. Each experimental group was therefore exposed to some common and some different teacher styles.

The exposure of each experimental group to the same teachers raises the possibility that the treatments were contaminated, and their exposure to different teachers the possibility that any effects due to the experimental conditions are also due to differences between teachers. The following measures were taken to restrict these potential effects.

During the six weeks between first contact with the staff and the commencement of experimental treatments, the experimenter held a series of briefings with teachers to standardize the treatments and develop precise and unambiguous instructions for teachers. Printed outlines of the procedures were prepared and discussed with teachers. The teachers of the classes in the Treatment I groups, the only treatment which required teachers to modify their classroom procedures, each developed a series of lesson plans which incorporated cooperative group tasks and these were discussed with the experimenter who provided comments which the teachers incorporated into their lesson plans. These discussions resulted in standardized procedures across the teachers.

During the treatment period the classroom procedures of teachers were checked by the experimenter by observations which averaged more than one observation of each teacher per week. The distinctions between the experimental treatments were explained and checked in observance in the same way with those teachers involved in more than one treatment group. These distinctions, between the normal classroom grouping and lesson techniques for the Control group, the maintenance of paired seatmates with normal lesson techniques for the Treatment I condition and the maintenance of paired seatmates with cooperative group tasks for the Treatment II condition, were gross differences in procedures which teachers were able to perceive and to follow without difficulty.

The assignment of students to seatmates was carried out by the experimenter, and maintained by his regular bi-weekly checks, and daily, lesson-by-lesson checks by teachers.

The purposive sample of students selected for this study is representative of the sociocultural groups drawn from the Central and Eastern Highlands of New Guinea in an approximate proportion to the populations of these groups and their access to elementary education. They represent an academically select proportion of the adolescents between the ages of 12 and 18 years, with a mean age of 14 years and 9 months, who have been enrolled in a high school for between nine months and two years. The school in which the study was conducted does not differ markedly from other government high schools with respect to curriculum or experience and qualifications of the staff, although the experience of the staff as demonstration teachers facilitated the study.

Comparison of the class groups within the experimental conditions supports the hypotheses that the groups in the three experimental conditions do not differ with respect to age or sociocultural composition, but do differ with respect to academic achievement such that the Control group contains a second form class which is superior to a class in the Treatment I and Treatment II conditions, and the Treatment I condition contains a class which is superior to the Treatment II condition.

Chapter IV

OPERATIONAL PROCEDURES AND THE DEVELOPMENT OF MEASUREMENT INSTRUMENTS

The Treatments

Contiguity in an association between members of different sociocultural groups is the most general construct with which this study is concerned. It is seen as an independent variable for the formation of attitudes between individuals who are members of different groups. The conditions under which contiguity occurs are also considered to be independent variables. The two conditions of contiguity which have been provided experimentally are the condition of association by forced compliance, and the condition of association by forced compliance where the form of association includes cooperation on superordinate tasks between the members of different sociocultural groups. Both conditions are related to the more general construct of cognitive dissonance by the logic developed previously (Chapter II).

Forced compliance is defined as a form of interaction between individuals wherein the behavior of the individuals as observed by others varies from the forms of behavior to be expected from the subjective opinions, attitudes or beliefs held by the individuals. The forms of forced compliance theoretically and empirically expected to induce a high degree of cognitive dissonance are those in which the individual does not perceive either a high reward or high degree of punishment to be associated with the behavior (Festinger 1957: 89).

Three experimental conditions were created to represent the independent variables of forced compliance and superordinate tasks.

The Control condition consisted of the degree of contiguity between students of different sociocultural groups to be found in normal classrooms in the school. A survey of the seatmates in Form One and Form Two classes taken before the treatments commenced shows the proportion of seatmates of different sociocultural groups to have been 55% and the proportion of seatmates of the same sociocultural group to have been 45%. The proportions did not differ significantly from Form One to Form Two classes, the respective proportions of different sociocultural groups being: Form One, 55.2%; Form Two, 54.2%.

For the Control classes, the proportion of seatmates of different sociocultural groups during the treatment period was 57.0%.

The students in these classrooms are given a free choice of their seatmate, from which it is inferred that no highly positive rewards or highly negative punishments are associated with their free choice, and the choices actually made by the students do not embrace associational behavior which varies from their subjective attitudes toward association, and therefore do not manifest a forced compliance condition. The degree of participation of members of different sociocultural groups on superordinate goals was expected to be low in these classes from previous observation in New Guinea classrooms which suggested the predominant mode of activity in them would be the independent participation of students on individual tasks. Empirical confirmation of the relative absence of interaction associated with superordinate tasks was sought by ratings of interaction between students in these classes. These ratings indicate there was less cooperative interaction between seatmates in these classes than was observed in the treatment classes. For the control classes, the average proportion of behavior between seatmates which was classed as cooperative was 4.7%, which compares with an average of 15% for the experimental classes.

The Treatment I condition was designed to provide for a degree of contiguity between members of different sociocultural groups which exceeded the degree to be found on the basis of the students' free choice. Students were asked to list the names of students they would prefer to sit with, in their order of preference. The students in each class were classified into sociocultural groups. Each student was assigned to a seatmate partner by reference to both the criteria that his partner was not among the first five choices of seatmate and was not a member of the same sociocultural group. These criteria satisfied, the allocation of students to seatmates was made by strict random procedure.

From the use of these criteria, the associations provided in the treatment are between members of two different sociocultural groups who do not indicate a preference to be associated. In these classes, 100% of the seatmates are composed of members of different sociocultural groups, compared with 57% in the control classes.

To avoid the possibility that students would perceive rewards or punishments to be implied by this procedure, the change was described as being necessary for the experimenter who described himself as a non-teacher who was visiting the school from a university in another country. This description was provided to dissociate the treatment from the rewards or punishments which might be associated with a change required by the teachers. To provide an empirical check on the students' perceptions of possible rewards or punishments associated with the treatment, a questionnaire was administered at the conclusion of the treatments. Data from the questionnaire (see Chapter V) support the inference that the experimental groups did not perceive a higher degree of rewards or punishments to be related to association with their seatmates than did the students in the control group. An analysis of variance for the distribution of perceived rewards and punishments between the Control, Treatment I and Treatment II groups is consistent with the hypothesis that no difference exists (F obt. < 1, F reqd. for significance at .05 level, 3.0).

Teachers were instructed to continue to employ their usual classroom techniques with the classes in this treatment and those teachers who taught classes in this treatment and classes in Treatment II were instructed to avoid setting cooperative tasks for the classes in Treatment I. Observation of the incidence of cooperation between seatmates in this treatment confirm that the proportion of cooperative acts in Treatment I was less than for Treatment II: the average proportion of cooperative acts was 8.0% for Treatment I and 24% for Treatment II.

Treatment II was designed to operationalize the constructs of forced compliance and participation in superordinate goals, as defined by Mazafer Sherif (1963: 131) in the context of relationships between groups:

> . . . superordinate goals are goals which are compelling and highly appealing to members of two or more groups, but which cannot be attained by the resources of any single group separately.

Within the context of the interaction between individuals in this study superordinate goals (tasks) are those which can be carried out only with the resources of two individuals acting together, where the individuals are drawn from two different sociocultural groups.

Forced compliance was induced by the means described above for Treatment I. That is, 100% of the seatmates are composed of members of different sociocultural groups, compared with 57% in the control classes. Superordinate tasks were introduced through procedures adopted by teachers to provide joint tasks for pairs of seatmates who were members of different sociocultural groups.

A joint task is one which requires the active participation of the members of the group toward its solution, and can only be performed if there is participation of all members of the group. The task has one single outcome by which completion of the task is recognized.

To ensure that the students differentiated between individual tasks which happened to be identical and joint tasks with a single outcome, teachers were required to evaluate only the single outcome. Where the outcome was used to evaluate the students who had contributed to it, teachers were asked to treat the students as a single unit, or pair, and to avoid reference to the individuals in a group.

The content of the tasks was drawn from the material in the usual subject areas for study by the class. Examples of tasks provided for the guidance of teachers included the joint solution by students of a number of problems (mathematics), the joint completion of comprehension exercises (English), the joint completion of a map or summary of information (social studies), the joint dissection of a specimen (science), the construction of a joint design (art), planting or weeding a common garden area (agriculture).

The groups for joint tasks were to be composed of a pair of seatmates in which each member of the pair was drawn from a different sociocultural group. Should the teacher wish to compose a group of four, they were to be drawn from adjoining seats and made up of students from four sociocultural groups. In practice, groups of two were the most often used.

Methods of incorporating joint tasks into lesson plans were developed through conferences between the experimenter and teachers in which the experimenter provided examples of appropriate forms of lesson modification. These examples are shown in Appendix AI. Samples of lesson plans were then prepared by the teachers.

Observation of Student Interaction

The effect of the treatment conditions on interaction between students in the experimental classes was measured by standardized rating procedures developed by the experimenter from the procedures reported by Flanders (1966). The raters were drawn from second-year social science students at the Goroka Teachers' College, students drawn from Papuan and New Guinea cultural areas. It was considered the observations of these students would prove to be more sensitive to the cues provided by New Guinea students than would observations by European observers, and hence use of the raters would increase the validity of the observations. Also ratings obtained from these students could be expected to reduce the danger of the reactivity of school students to the rating procedures since the school students were accustomed to the presence of teachers' college students in their classrooms during demonstration lessons.

The experimenter developed a classification of interaction between seatmates into categories which were designed to be exhaustive and mutually exclusive. For each category an operational behavioral definition was provided, and typical situations for each category were demonstrated by role playing to the raters. The categories were applied on trials with classes in an elementary school and found to include all observed interactions. The categories, together with the brief behavioral definition used on each rating sheet (Appendix AII), are:

Cooperation (individual gives help or assistance, plays his part in a joint activity, lends materials); independence (no contact with other individual, person does not compare his work or actions with other); competition (attempt by individuals to excel, use materials first, compares work with other); conflict (exchange of argument, physical violence, or dispute over materials or work procedures between individuals); dominance (one individual shows hostility not returned, criticizes other, uses materials first); submission (one individual accepts dominance of other). The competition and conflict categories were separated by the criterion of apparent hostility, absent in competition but present in conflict. Dominance and conflict were distinguished by the presence of the exchange of argument or attempts at dominance in conflict, but absence of the exchange in dominance. Dominance was identified further by the category of submission. Where submission did not occur with dominance, raters were asked to check their observation of dominance.

The raters were trained for three hours in role-playing sessions using their own group and for a further three hours of observation of senior elementary classes in the school adjacent to the teachers' college. The limited availability of the students due to their college timetable, and to a practice teaching program which dispersed them to the countryside for two weeks, precluded further training periods. Eight students whose ratings showed the highest degree of agreement at the end of the training period were selected from the original twelve to act as raters of the experimental classes.

Scott coefficients of reliability between the eight raters varied between .70 and .80 at the end of the training period, coefficients less than those suggested by Flanders as sufficient to justify the use of individual raters as the basis for comparison. His own research, in which raters classified the verbal responses of teachers and students, reported coefficients in the order of .85. In this study, the need to observe interaction between students which was frequently not verbalized, or if verbalized was not audible to the raters, meant that raters were able to perceive fewer behavioral cues. This factor may explain in part the lower coefficients obtained.

Because of the relatively low reliability between individual raters, the panel of raters was used for observations within each class. A pair of raters observed each unit of two students sampled. The panel of raters was constant between the classes in each of the experimental groups.

The need to use a panel of raters required the limitation of the sample of observations. Classes in English were selected to give some standardization and wider opportunities to observe when the raters were available. Because the availability of the panel depended upon their ongoing program at the teachers' college, the sample of English classes obtained was essentially accidental. Within each classroom the pairs of seatmates for observation were chosen by random procedure without replacement.

A standard procedure was developed for the rating observation. The experimenter gave a signal for the panel to commence rating as soon after the commencement of the lesson as the pairs of students to be rated were identified. Raters recorded one interaction each ten seconds for a continuous period of six minutes. The time for commencement and completion and the ten-second intervals were indicated by the researcher by signal as neither the classrooms nor the raters were equipped with clock or watches. At the completion of the six minutes each pair of raters in the panel recommenced rating a further pair of students.

Attitude Scales

The dependent variable in the study is change in the disposition of the students in the study toward association with members of different sociocultural groups. Several criterion measures of change in dispositions relative to different contexts of association have been developed, in the spirit of the concept of multiple operationalism as developed by Campbell and Fiske (1959) which suggests the need to utilize more than one measurement method and more than one trait as criterion measures to evaluate the validity and reliability of an experimental effect.

Two scales were designed to measure changes in the attitudes of students toward association with students from other sociocultural groups. The School scale provided for responses to a number of items directed toward a student's willingness to associate with students of a different sociocultural group in the common situations provided in the school behavior settings. The Out of School scale provided for responses to the common situations of associations which are to be found in the context of the schoolboy's life in the community provided by the town and by the village setting, contexts in which a student's behavior could be expected to be observed and commented upon by members of his own sociocultural group whose attitudes could be expected to be more responsive to traditional attitudes toward association and less responsive to the common status of individuals as schoolboys which is to be found in the school. These two contexts of association were chosen to provide criteria for the evaluation of the generalizability of any changes at least with respect to these two social contexts.

The potential universe of content for these scales was initially explored through a series of informal interviews with secondary school students from Form One and Form Two drawn from the similar schools in the Eastern Highlands not included in the study, and through interviews with students from the Teachers' College. Students were asked to indicate the settings and situations in which they associated with others, the people they associated with in these settings, defined by cultural groups, and they were asked to give the situations in which they associated with members of their own, or with members of other social groups. Students at the Teachers' College were presented with a number of situations of contact, e.g., sit next to a person in class, sleep in the same dormitory, play on the same sports team, etc., and asked to rank these in terms of the degree of friendship or intimacy these associations represented. These interviews were supplemented with observation of the association between students across the daily routine of students in the Goroka High School.

The scales used to measure attitudes toward association in previous research were consulted for items which might be appropriate for school students in Papua and New Guinea, and, in a more general sense, to indicate the order which items might be expected to demonstrate on a favorable-unfavorable attitude continuum. The scales used by Bogardus (1933), Hafeez Zaidi (1967), Webster (1961)[1], Lever (1965), Miller and Biggs (1958), as well as a number of scales related to interethnic attitudes described by Shaw and Wright (1967) were consulted. The only one of these scales specifically designed for school students and with items which refer specifically to contact situations within the school is the modification of the Bogardus Social Distance Scale for Children of Miller and Biggs. Their research reported an "acceptable" coefficient of reproducibility but did not report the coefficient obtained. The scale used by Hafeez Zaidi is the only one developed for use with a non-European culture group. While lacking a focus on the particular group and the particular situations under study, the other scales provided a subjective feel of the type of item and situation which might prove to scale.

The items were formed to refer to the construct of social distance. As defined originally by Bogardus, social distance is the degree of sympathetic understanding that exists between two persons (1933: 268). Heider (1958: 191) defines the construct as the degree of interpersonal closeness one accepts, such that, for example, acceptance of the marriage relation represents a minimal degree of social distance, community ostracism the other extreme. These concepts of sympathy with, understanding of, and closeness to, are associated with specific social contexts or settings in scales of social distance. Scales of social distance, therefore, are quite direct criteria of the disposition of individuals to associate with others across different behavior settings, the dependent variable of this study.

Measures of social distance have customarily been susceptible to scaling by means of scalogram analysis. Accordingly, this method was used in this study to attempt to develop each scale. The following procedures were adopted.

Items developed from the guidelines above were administered to random samples of 20 students in the nearby mission schools drawn from the same sociocultural groups as those in the target school. The items were analyzed by the scalogram analysis procedures described by Edwards (1957: 172-198) as the Cornell technique. Individuals are ranked according to the favorability of their total response to all items under consideration, and the statements are evaluated by the coefficient of reproducibility of the scale which they form. Items which evidence the largest degree of error, defined as responses which depart from those to be expected were the scale to have perfect reproducibility, are eliminated, as are items with the same proportion of favorable and unfavorable responses, at each stage of the analysis until the set which yields the highest coefficient of reproducibility is found. The development of items, and their analysis was carried out in the following stages.

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[1] Provided by personal communication with the researcher.

Fifteen items for the School Scale, and eleven items for the Out of School Scale were drawn up and administered to a random sample of students at Asaroka Mission High School. Each student responded to the same sociocultural group, the Agarabi people of Kainantu, to provide a consistent point of reference. The total set of items in each scale yielded coefficients of reproducibility of .75 to .80. Subsets of these items, after items with high errors were eliminated, yielded coefficients of .85.

A second School and Out of School Scale were developed from the evidence of response patterns to these items. The expanded forms of the School Scale contained 36 items and the Out of School Scale contained 24 items including new items, re-worded items, and those relatively free from error on the first trial. The target for responses on this trial was changed from the Agarabi people of Kainantu to the Chimbu people to ascertain whether the proportion of favorable responses obtained in the first trial was specific to the Agarabi people. These scales were administered to a random sample of students from the highland cultural area at the Kabiufa Seventh Day Adventist Mission High School. On this trial the School items as a whole yielded a coefficient of reproducibility of .82, and a subset of eight items, a coefficient of reproducibility of .92. The Out of School items as a whole gave a coefficient of reproducibility of .73, and a subset of nine items gave a coefficient of reproducibility of .89, with a minimum marginal reproducibility of .80.

In an attempt to provide items which would represent more and less favorable attitudes so as to increase the number of points on the scale, as well as to provide items with a smaller proportion of error, the experimenter decided to obtain judgments of the relative favorability of the items by using the method of equal appearing intervals. It was felt that secondary school students may not have been able to understand clearly and apply a consistent criteria of judgment to the task of judging the items, so the students of the Goroka Teachers' College from the Highlands, numbering 15, were empanelled as judges. Each judge was presented with each separate item and asked to place the item on an eleven-inch line (following a procedure developed by Ballin and Farnsworth reported in Edwards 1957: 95). Values of dispersion (Q) were obtained for each item; values of equal to or less than 3.0 were obtained for 19 items from the School Scale and for 18 items on the Out of School Scale, and the scale scores obtained ranged from 1.0 to 9.8 on the School Scale and 1.0 to 9.9 on the Out of School Scale.

A third School Scale was then developed from the items which yielded the highest coefficients of reproducibility by scalogram analysis and the lowest Q values from the judgmental technique, together with further items which the researcher judged to be likely to increase the number of items with different cut-off points. The reference group for this trial was the Chimbu people, chosen because they differ most from the other sociocultural groups. These items were administered to a random sample of 40 highland students at Asaroka Mission School not chosen for the previous trial. To investigate the effect of providing for a "don't know" response, in addition to the "yes" - "no" responses provided in the previous trials, one group of students responded to forms providing for the three responses, and one group to forms providing for two responses to each item. The School Scale with a two-response mode yielded a coefficient of reproducibility of .90 for 16 items, and a minimum marginal reproducibility of .80. Inspection of the results from the three-response mode form indicated a less satisfactory coefficient of reproducibility.

A number of factors may have contributed to the lack of improvement of the characteristics of the third form of the School Scale over the second form, although additional information from the judgmental technique was available. These factors led the experimenter to question the incremental value of proceeding further with scale development to attempt to reach the higher coefficients of reproducibility reported in the literature cited above. These studies have derived coefficients from the use of scales in which one homogeneous ethnic and/or sociocultural group has responded to another. In this case, the students were drawn from a number of sociocultural groups, conceived of as being different one from the other. The lack of consistency of response to each item reflected in the coefficients of reproducibility may reflect responses which vary from response group to response group. The responses obtained are from heterogeneous sociocultural groups toward the same target group.

A second factor may be a relative instability of the stereotype of the target, Chimbu group. Although this group was chosen as the target for responses because it has been identified above as the sociocultural group which differs culturally and ethnically most clearly from the groups in the Eastern Highlands, the pattern of cultural and ethnic difference is one of a cultural drift, or gradations of cultural difference, rather than one of sharp discontinuity from the Eastern to the Central Highlands.

The recognition of sociocultural groups by students which is described in the ethnographic and empirical evidence cited above (Chapter III), is an emerging, and hence changing phenomenon, such that the elements of the stereotype Chimbu may include elements which are held in common by members of other sociocultural groups, and elements which differ between these groups and from individual to individual.

Webster (1961) reports a coefficient of reproducibility of 96.4 for the social distance scale he used with white and Negro high school students in California. The range of intimacy of contact in the items which formed the scale is from the individual's willingness to have members of the other ethnic group share a room at a summer camp, to live in the same building, to the individual's willingness to sell his house to members of the other group. These items are ranged across a wide variety of social contexts. The equal appearing interval form of the Bogardus scale reported by Shaw and Wright with an average split half reliability of .90 varies from the acceptability of the target group as marriage partners to the acceptability of the target group as residents in the same country.

For the present research, the possible range of intimacy of contact in the context of the school appears to embrace a smaller subjective range, from an individual's wish to sleep next to a member of another group in the dormitory to an individual's wish to exclude members of another group from schooling. The range of intimacy and of social contexts for the Out of School Scale, however, appears to embrace a wider range, from the individual's willingness to attend church with and to marry a member of the other group, to a desire to have members of the other group excluded from the Highlands. The wider range of this scale did not yield a higher coefficient of reproducibility than the narrower range of the School Scale. The comparison suggests that the range of the scales was not a major factor which influenced the obtained coefficients.

Items which would represent the central dimension of association and sympathetic understanding were sought through the successive trials of items in each scale, guided by the empirical evidence of the error component for each item and a subjective examination of items. Items which referred to willingness to accept others as prefects or sports team captains showed a high proportion of error which the experimenter inferred to be due to an additional, authority relationship implicit in the association and were therefore dropped after the first trial.

Ambiguity of item meaning was reduced. General, unspecific items were also successively eliminated in favor of items which specified the association. For example, the item "I want to eat in the mess with these people" became "I want to share my own food with these people". General statements of acceptability of an association were replaced, so far as possible, with more definite statements of intention. "I would have a member of this group in my dormitory" became "I want to sleep next to one of these people in my dormitory this year". Throughout the development of items, ambiguity within item wordings, complexity of phrasing, and item length, were controlled by rewording and re-phrasing to accord with the language development of the students, and the formal advice on common semantic difficulty provided by Payne (1951).

Following the six weeks of trials with similar students, the items selected by these methods were administered in the forms shown in Appendix AIII and Appendix AIV to the experimental group in the Goroka High School. Each student was identified by a serial number and was not required to provide his name. The target sociocultural group for each student was the group identified with the seat partner to which he had been assigned by the experimenter without the student's knowledge. Students in the treatment classes were placed with their assigned seatmates on the day following this administration; those in the control classes retained their existing seatmates throughout the treatment period.

The responses of the 231 experimental students to the items were then submitted for analysis by computer to the Computer Center, University of California, Berkeley. The GUTS program developed by the center is designed to generate a Guttman scale, or set of scales from an item pool, such that the items selected form a scale or scales with the highest reproducibility possible from the responses (Krasnow 1961).

The program generated a nine-item School Scale with a coefficient of reproducibility of 89.1, and a six-item Out of School Scale with a coefficient of reproducibility of 89.7. The School Scale yielded scores which range from 0 to 9 with a mean of 4.8 for the total experimental group, and the Out of School Scale, scores which range from 0 to 6 with a mean of 3.6, thus providing for a change in mean gain or loss scores to be associated with the experimental conditions. The items used in each scale together with the mean score for each item, are indicated by an asterisk in Appendices AIII and AIV.

A test-retest coefficient of reliability for each scale was obtained from the administration of these scales to a random sample of students from the same culture area and the same form level at a ten-day interval. For the sample of 66 students the coefficient of stability for the School Scale was .73, and for the Out of School Scale, .76.

To provide a measure of attitude toward other sociocultural groups less anchored in the social situations to be found in the school and the community and less anchored to actual associations, scales from semantic differential developed by Osgood, Susi and Tannenbaum (1957) were used (Appendix AV). The scales were chosen from those scales with a high loading on the general evaluative factor, the factor with the strongest face validity as a measure of a generalizable attitude. The construction of the semantic differential as a set of bipolar scales which require evaluation in terms of verbal meanings, suggested a level of abstraction in the attitudes which might permit the identification of slight changes in attitude which could be designated as shifts in the favorability of disposition toward the other sociocultural group. By comparison, the specific social situations contained in the School and Out of School Scales could be expected to be more constrained by the social and cultural restraints placed on the association of students by their cultural backgrounds. Pilot use of the semantic differential scales with secondary students in the non-experimental schools indicated individual consistency of response to the different items and differences in response between individuals, such that more favorable responses were made to the individual's own group than to other sociocultural groups.

Sociometric Test

A second measure of the dependent variable -- change in the disposition to associate -- was obtained by reference to changes in the choices of seatmates during the experimental period made by students in the experimental groups. The measure of change was derived from the responses of subjects to a pencil-and-paper sociometric test administered before the treatments began and at the end of the treatment period. Students were asked to write down the names of the students they wished to sit next to in class in their order of preference, and to indicate the name of the people the chosen seatmates belonged to. Responses were classified by sociocultural groups and change in the number of students from different sociocultural groups was used as the index of change for each student.

The face validity of a sociometric measure of attitude is supported by Heider's (1958: 190) discussion of the relation between sentiment and an individual's behavior toward seeking out contact with others such that an individual who likes another will seek close contact with that other. Campbell, Kruskel and Wallace (1966) consider students' associational behavior in a classroom to be in part a reflection of lack of opportunity for acquaintance rather than pure evidence of attitude, but conclude that where there are marked shifts in seating aggregation in the classroom over time,

> these might reflect shifts in interracial fear and good will superimposed on the baseline provided by prior acquaintance opportunity (p. 2).

Maas (1949) investigated whether the changes in attitude revealed by a social attitude scale were correlated with the changes obtained from sociometric choice of seatmates and workmates among college students. He found changes in the first sociometric choices to be correlated positively with changes revealed by the attitude scale, but less clear evidence for a correlation for the second and third choices.

In the present study sociometric choice appears to have realism given the policy of the teachers of allowing students a free choice of seatmates in the classroom. While prior acquaintance between students, or propensity of students to associate with others because of academic ability or other factors may obscure the underlying disposition, these factors might be expected to be constant between the treatment groups. The index derived from sociometric choice can also be expected to be sensitive to the treatment conditions which brought about a forced association between students. Further, association as seatmates provides an unambiguous, standard social context against which students may express a preference (Appendix AVI).

A Measure of Actual Association

The attitude scales and the sociometric measure provide evidence of change from verbal, paper-and-pencil questionnaires, evidence which is responsive to the various classes of invalidity Campbell, Kruskal and Wallace have described as "voluntary or unconscious distortion, self-consciousness, reactive effects upon attitudes, and awkwardness of administration" (1966: 1). Evidence of actual behavioral change in associations was sought to provide evidence free from the distortions associated with these methods.

The criterion chosen was change in the sociocultural composition of the students with whom an individual associated in the school playground. As noted above, this setting is one of the few available to the student in which he is free of the constraints placed on his behavior by the formal organization of the school which places him in house groups and class groups for the school day. In the playground, the student is free to move as an individual and to choose his associates from the total population of the school. At the same time, the student in the playground is placed in a social context which is close temporally and spatially to the social context of the classroom, the setting of experimental treatments. The playground associations of the individual student, therefore, may be expected to be sensitive to the associations which he experiences in the classroom, which occur immediately before and after the period of time spent in the playground. Observation of the formation and the consistency of the playground groupings over space and time suggested that the regularity of these groupings would provide a baseline against which experimental effects might be measured.

After an attempt to survey the composition of the playground groups by students from the Teachers' College indicated that the direct observation of students appeared to be reactive through inhibiting the movement of students between groups, and showed the difficulty of obtaining data for more than a small proportion of students, a self-report questionnaire on playground associates was prepared for use as a pretest and post-test. The questionnaire is shown in Appendix AVII. Changes in the number of students from other sociocultural groups the individual associated with in the playground between the pretest and the post-test appeared to the researcher as a simple and direct criterion of change.

In summary, the criteria used to assess the experimental effect involve the assessment of four traits by the use of three methods of measurement. The traits may be described as a generalized disposition toward other sociocultural groups, dispositions to associate with members of other sociocultural groups in a range of social situations located in the school and in the community outside the school, the desire of students to associate with members of other sociocultural groups as seatmates in class, and the associational behavior of students from different groups in the playground. Traits were assessed by means of two types of attitude scales, by sociogram, both methods dependent upon self report of the individual's intention to act, and by a self report measure of actual behavior.

Treatment and Testing Procedures

Pretesting procedures commenced in the week beginning the 7th of October and post-testing procedures were completed in the week ending the 6th of December, 1968. Treatments were commenced on the 11th of October and continued until the 29th of November, for a period of seven weeks which was most of the third school term.

The attitude scales, playground survey, and sociometric test instruments were administered to all students in the experimental classes in the week before the treatments commenced, and in the week after the forced associations of students were discontinued, so that the conditions of student association under which they were administered were constant, except for the intervening experience of association in the treatment period. Each test administration was conducted by the researcher. Each test was given to all experimental classes on the same day, and to each of the first- and second-year classes between the same recess periods to avoid discussion between students in different treatments.

A playground survey of the morning recess was taken on each of two days to provide the pretest sample of associations to allow variation which could be expected from day to day to be reflected in the measure. All experimental classes were surveyed each day. The same weekdays and recess period were used in the post-test administration of the survey. A full class period was used for the students' responses for each class and for each administration.

The sociometric test was administered in a class period. The three attitude scales were administered as a single battery to each class during normal class periods while each student sat next to his freely chosen seatmate. The battery was administered to all classes on the same day, to all Form One classes between the same recess periods, and to all Form Two classes between the same recess periods. Each student was given a test battery identified by a serial number placed unobtrusively on the underside of the test paper. Each was told his response was anonymous, and that the results for the class would not be divulged to members of the school staff or to other students. The name of the sociocultural group to which each student responded was printed on each individual test. This was the name of the group to be represented by the seatmate chosen at random from the other sociocultural groups in the class, and subsequently to be allocated to the individual as a seatmate in the Treatment I and Treatment II classes, but not allocated as a seatmate in the control classes.

Following the allocation of students to seatmates in the Treatment I and II classes, daily checks to see that seatmate pairs were retained were made during the first week. The students in the 1C class, which had no home classroom and moved to other rooms several times each day, showed a tendency to disperse and be re-seated with their previous seatmate partners. The class was told by the experimenter that he wanted them to spend each period with their allocated seatmate, an instruction to which most students had conformed after the first two days. Further requests led to the required pairs being formed by all students by the end of the first week. In the other classes only one student requested that his allocated seatmate be changed. Questioning revealed that he objected to the new seating arrangement because it was too close to the front of the classroom. He conformed to the change of partners when allowed to retain his previous seat.

Bi-weekly checks by the experimenter were maintained on each class for the treatment period. Teachers of agriculture, craft, and physical education, in which seatwork played a minor part, were asked to maintain the allocated pairs wherever work in pairs was normally used in these lessons. All teachers of each class were provided with a copy of the allocation of seatmates and asked to maintain the pairings. When teachers reported a separation of the pair during the treatment period, the experimenter visited the class and asked the students to maintain the pairings. With the exception of the students in the 1C class in which constant movement appeared to induce a tendency to separate, these observations revealed few cases in which the allocated students had separated between checks.

Joint tasks were introduced into the lessons for the Treatment II classes following the instruction given to teachers before the treatment period. At the end of each week each teacher was asked to indicate the time allocated to activity on joint tasks during that week. From these reports the time spent on joint tasks averaged 3 hours 2 minutes per week for 1B and 2 hours 30 minutes for 2C, or between 18 hours and 15 hours for the duration of the treatment. Conferences were held with individual teachers to confirm that the procedures they were adopting conformed to the definition of joint tasks, and the observation of student interactions afforded further opportunity to check procedures while apparently observing students. Experience with group tasks was interrupted during the fifth week of treatment for yearly assessment examinations. The seatmates allocated were maintained throughout.

The post-tests were administered after the end of the treatment period. Students were told they could change their seat partners if they so desired for the remainder of the school year. The association between seatmates was standardized with the pattern at the time of the pretest during the administration of the attitude test battery and the sociometric test, by asking students to sit with the person who was their seatmate before the experimenter had asked them to change. The same timing of administration of test instruments was observed as for the pretests.

Chapter V

RESULTS

Empirical Observations of Treatments

Evidence for Forced Compliance

Evidence for the inference that the treatment conditions represent a condition not associated with high rewards or high punishments was sought by means of a questionnaire administered to all students in each group at the end of the study. Each student was asked to indicate his perception of the effect of his association with his seatmate on three criteria. These were his scholastic achievement, his relationships with his friends, and his relationships to his teachers. These three criteria were judged by the experimenter to be important sources of rewards for the student related to the experimental conditions of interaction. Each student was asked to indicate whether he perceived the result of association with his seatmate to have been to increase his achievement and the approval of his teachers and friends, no change in these relationships, or a decrease. The responses of each individual to the three items were added to yield an individual score; perceptions of an increase in achievement or of liking by friends or teachers were scored as positive, no change as zero, and a decrease in achievement or liking as negative. The distributions of scores for each group are shown in Table 4.

Table 4

Distribution of Perception Scores

Score	Control	Treatment I	Treatment II
	f	f	f
+3	0	0	2
+2	6	4	3
+1	18	15	22
0	45	44	42
-1	6	12	3
-2	1	1	4
-3	1	1	1
n =	77	77	77

The hypotheses that the students' perception of the consequences of association differed as between the control group and the treatment groups and as between the treatment groups were tested by means of planned and *post hoc* comparisons on the simple analysis of variance model. For each comparison (control as average for treatment groups; control vs. Treatment I; Treatment I vs. Treatment II) the test results are consistent with the null hypothesis. There is no statistical evidence which supports the rejection of the hypothesis of no difference between the groups.

This evidence supports the inference that the perception of "rewards" and "punishments" associated with the treatment conditions did not differ from those associated with the control condition, a condition in which the students freely chose their seatmate partners, and it supports the inference that perceptions for the two treatment groups did not differ. Thus, on these criteria of perceived rewards and punishments, the evidence is consistent with the inference that the treatments provided a condition which was perceived by students to be neither highly rewarding nor highly unrewarding.

Evidence for Perceived Status

The relative status of participants in interaction has been inferred to be a variable which influences the outcome for interpersonal sentiments (Homans 1950) and the inference is consistent with a derivation from balance theory discussed above (Chapter II). Variability between the groups on the individual's perception of the relative status of his seatmate has not been controlled by the sampling procedure. It is possible that the different procedures of free choice and random assignment, by which the control and experimental groups obtained seatmates, could produce differences in the proportion of associations marked by perceived equality and inequality of status.

To investigate this possibility each student responded to a set of items at the conclusion of the treatment period directed toward his perception of his seatmate. Each student was asked to give his perception of his seatmate's characteristics on a number of criteria judged to be related to the seatmate's relative status. The relative age of the seatmate was used as one criterion since age is a status criterion in Highland cultures. Performance in school work, and in sport, was used because these criteria were suggested by students in interviews to be important ones for their choice of prefects. The number of friends was used as a further criterion on the experimenter's judgment that it had face validity as a measure of social status.

Two further items related not to the specific characteristics of the individual seatmate, but to generalized characteristics of his people. One of these characteristics was the relative size of the seatmate's sociocultural group, a status criterion in traditional social relationships, and the other the group's knowledge of new ways, a criterion of sophistication mentioned in interviews with students as being related to the importance of sociocultural groups (Appendix AVII).

The four items which refer to the seatmate's characteristics were combined to form an "individual" index of relative status by adding the individual's responses, and the two items which refer to the characteristics of his sociocultural group were combined by addition to form a "sociocultural" index. The distributions of scores on each index are considered in turn below.

Table 5

Distribution of Scores, "Individual" Index of Relative Status

Score	Control f	Treatment I f	Treatment II f
+3	0	3	0
+2	15	3	10
+1	24	22	17
0	20	22	32
-1	7	19	10
-2	8	7	8
-3	3	1	0
n =	77	77	77

The distributions of scores were compared by means of planned and post hoc comparisons based on the simple analysis of variance model. For each of the planned comparisons of the control with the average of the treatment groups and for the comparison of Treatment I with Treatment II, the null hypothesis was accepted. The null hypothesis is accepted also for the comparison of the control with each of the treatment groups as the overall value of F is not significant. This evidence is consistent with an inference that the groups do not differ in the perceived relative status of the students in interaction.

Table 6

Distributions of Scores on Sociocultural Index
of Relative Status

Score	Control f	Treatment I f	Treatment II f
+2	0	2	2
+1	18	15	14
0	49	44	46
-1	9	16	12
-2	1	0	3

Analysis of these distributions is by the same methods as for the "individual" index. The null hypothesis is accepted for each comparison.

The evidence from both these indexes of relative status of students in interaction support the inference that the groups do not differ with respect to the students' perceptions of the relative status of their seatmates. Status differences are therefore ruled out as a factor which could influence the treatment effects.

Observations of Interaction Between Seatmates

These observations provide empirical data for a comparison of the actual interactions between students associated with each experimental condition. The proportions of behavior in each category are shown in Table 7. The categories are defined above, pages 46 and 47.

Table 7

Proportion of Interaction,
by Category, Experimental Groups

Category	Control	Treatment I	Treatment II
Cooperation	4.6	8.3	24.4
Independence	91.5	88.8	72.2
Competition	1.5	1.8	1.0
Dominance	.9	.7	1.3
Submission	.7	.3	.9
Conflict	.8	.1	.2
	n = 31	n = 24	n = 32

(n refers to the number of student pairs observed.)

Inspection of these data shows a higher incidence of cooperation for both treatment groups than for the control and a lower incidence of independent activity for both treatment groups than for the control. The proportion of interaction classed as competition, dominance, submission, and conflict, classes of behavior which could be expected to be aversive, varies little between groups and does not show consistent variation as between the control and treatment groups. They tend to confirm that the effect of the treatments was to increase interethnic contact and cooperation such that this contact was greater for the Treatment II group task condition. They also tend to confirm that the greater degree of interaction in the treatment conditions was not associated with a greater degree of potentially aversive interaction.

Tests of Hypotheses and Inferences as to Treatment Effect

The distributions of scores for each criterion measure will be examined for evidence of treatment effect by a number of procedures.

The numerical scores will be examined first by simple observation to indicate consistency with the general hypothesis that there is a treatment effect, that this effect is in the direction hypothesized, that is, there is a more positive association with out groups indicated in the treatment groups, and that the effect is greater in the Treatment II condition than in the Treatment I condition.

These numerical scores will then be examined by reference to a number of statistical models appropriate for the comparison of three groups, to provide evidence against the null hypothesis appropriate to each alternative experimental hypothesis.

The sample plan used in this study first involved the selection of six classes from the classes in Form I and Form II and then the random assignment of each class to an experimental condition. The statistical model which is most appropriate for this procedure is the analysis of variance, groups within treatment design (Lindquist 1956: 172-189).

A major assumption which underlies the model is that the groups are selected from a large possible population of groups, an assumption which is not met in this case. The chief problem this raises is the possible threat to internal validity of comparisons between the experimental conditions through the operation of an interaction between the particular groups and the treatments. Evidence for or against the possibility of this interaction will need to be compared with the results derived from this statistical model. A disadvantage of this model is its low statistical power. Differences between groups are evaluated against a small number of degrees of freedom. Should the tests based on the model confirm the presence of a difference, a high degree of confidence may be placed on them; should the tests deny the presence of a difference, a difference may still be indicated on the basis of a less rigid sampling assumption.

A more powerful statistical model is provided by a simple analysis of variance based on the assumption of the random assignment of individuals to experimental conditions, since tests on this model are evaluated with a larger number of degrees of freedom. This assumption is not justified by the sampling procedure followed and must be evaluated against evidence that the samples obtained are to be considered to be consistent with the assumption of random allocation of individuals to groups.

These two models can be applied to provide statistical tests of each of the experimental hypotheses on the assumption that the measurement instrument provides interval data. A less powerful test, and a less direct test, which provides evidence for the more general hypothesis of a difference between experimental groups is provided by chi-square. This is based on the assumptions of ordinal data and random sampling of individuals into groups. With the reservations on this second assumption noted above, a significant chi-square test will be used to indicate the presence of differences between the groups on the criterion measure.

These limitations upon the satisfactions of the assumptions underlying the statistical tests mean that the tests do not indicate unequivocal evidence for the presence of an experimental effect given the rejection of the null hypothesis. Judgmentally, the departure from assumptions as to the level of measurement and randomness of assignment of individuals and of groups, is the more serious for those tests on the analysis of variance model which offer the greater precision as tests of the individual experimental hypotheses. Of these tests, the greater departure from the assumption of randomness to result from the sampling plan is with the simple analysis of variance model, the model which yields the greater statistical power.

Accordingly, the strategy to derive inferences as to treatment effects will consider first the consistency of the numerical results with the general hypotheses, then the results of statistical tests for the experimental hypotheses. The strength of the evidence from the statistical tests will be evaluated essentially on the basis of the two criteria of the power and the robustness of the test with respect to departure from its assumptions. The strongest evidence to confirm a hypothesis of experimental effect will be provided by the consistency of test results such that inferences which are supported by the results from both analysis of variance models are to be regarded as stronger than those for which there is support from the more powerful model, but lack of support from the less powerful model.

The pretest/post-test control group design of this study, as applied through the sampling plan of assigning groups to treatments, incorporates a major threat to the validity of inferences in support of a treatment effect. Campbell and Stanley (1966: 49-50) identify the threat as the possibility of interaction between maturation and selection such that existing initial differences between the groups may react differentially to the experimental conditions. This interaction is judged to be more likely to occur when there is a difference between the groups on pretest scores where the pretest variable is related to the criterion measure. For example, where, in the present study the tendency for individuals to choose an outgroup seatmate partner is related to his tendency to change toward a choice of more or fewer outgroup partners. Interaction is judged to be less likely to occur, but is nevertheless a possible threat to internal validity, where differences associated with the groups are not associated with differences on the pretest. It can be most strongly but not wholly denied only where simple random sampling procedures are followed.

The possibility of this form of interaction will be investigated by reference to the comparison of the groups on the criteria of age, ethnicity and academic achievement made above and comparison of each group on the pretest scores. The possibility of interaction will then be assessed against its likely effect upon the criterion measure.

The comparison of groups on the pretest scores will be made by means of _t_ tests for the comparisons of pairs of means. This technique is conservative with respect to the null hypothesis. That is, a difference is more likely to be found than is indicated by the chosen level of confidence. Evidence against the hypothesis that there is a difference does not, however, directly confirm the hypothesis of no difference. Hence the level of confidence at which a difference can be asserted will be reported for these _t_ test data, and the results will be reported as either being consistent with or not consistent with the assumption that the groups do or do not differ.

Should the groups differ on pretest scores, and interaction with treatments in fact occur, the relationship of the interaction to the hypothesis of treatment effects can be assessed by reference to the cognitive dissonance theory which underlies this study. This theory asserts that the amount of change is positively related to the amount of dissonance.

For comparisons between the control and treatment conditions, a pattern of pretest scores in which the treatment groups' scores are less than control scores would be expected to indicate a greater degree of change for the treatment groups. The presence of interaction would thus be against the inference of treatment effect. A pattern of pretest scores in which the treatment groups are higher than the scores for the control would be expected to indicate a lesser degree of change for the treatment groups. The presence of interaction would therefore tend to strengthen the inference of a treatment effect. The same relationships apply for comparison of the Treatment I and Treatment II effect.

In general, then, any inference of treatment effect must be qualified by inspection of the pretest scores. Where differences between these are in the direction of higher scores for the group in the theoretically less dissonant condition, the inference is conditional upon the possibility of a selection-interaction effect.

The evidence relevant to each criterion measure is considered below.

Sociometric Choice Data

Sociometric test results are the change in the number of students who belong to a different sociocultural group mentioned in the individual's first three choices of seatmate partner from the pretest to the post-test. The criterion measure represents a change in the individual's disposition toward association with members of other sociocultural groups in the specific interaction of seatmate partner. This criterion is closely associated with the changes introduced as treatment conditions, and is therefore expected to be sensitive to treatment effect.

The pretest means and variances for each group are shown in Table 8.

Table 8

Pretest Means and Variances, Sociometric Data

	Control	Treatment I	Treatment II
$\overline{X}$	1.93	1.90	1.80
s^2	1.0	.87	.83
n	77	77	77

The hypothesis that a difference exists between each pair of means was investigated by means of a t test. For the comparison of control with Treatment I, the t value obtained of .18 would allow a difference to be asserted at only the 20% level of confidence; for the comparison of control with Treatment II, the t value obtained of .87 would allow a difference to be asserted only at the 60% level of confidence; for the comparison of Treatment I with Treatment II, the t value of .71 would be consistent with a difference only at the 50% level of confidence. Since each of these values falls short of a value which would be consistent with differences at a conventional level of confidence, the hypothesis of no difference between means is accepted. The pretest scores are consistent with those to be expected on the basis of random assignment of individuals to treatments on the criteria of sociometric choice.

The distributions of change scores for each group are shown in Table 9. A positive change indicates the individual made more outgroup choices on the post-test, a negative change indicates fewer outgroup choices, zero change indicates no change in the number of outgroup choices.

Table 9

Distributions of Change Scores, Sociometric Test

Change Scores	Control f	Treatment I f	Treatment II f
+3	0	1	1
+2	1	3	6
+1	5	14	18
0	54	42	42
-1	15	13	9
-2	2	4	1
-3	0	0	0
n	77	77	77
$\bar{X}$	-.156	+.026	+.274

Inspection indicates the stability of students' choices of seatmates from other sociocultural groups throughout the treatment period; the majority of students in each group did not change. The changes which did occur are both positive and negative in each group. The number of individuals to show positive change are greater in the treatment groups than in the control group, and the number of negative changes were fewer, or not more than, the number of negative changes in the control group.

The number of students in each group to show positive change (more outgroup choices), no change, and negative change (fewer outgroup choices), in each group is shown in Table 10.

Table 10

Number of Students in Each Group to Show Positive, Nil, and Negative Change, Sociometric

Change	Control	Treatment I	Treatment II
Positive	6	18	25
Nil	54	42	42
Negative	17	17	10
n	77	77	77

Using this ordinal data, the hypothesis that the proportions of change in each group do not differ was examined by means of a chi-square test for k independent samples with the .05 level of significance. The chi-square value obtained was 16.8, compared with the value of 9.5 required to reject the null hypothesis. Under the assumption that individuals are randomly assigned to groups, these data are consistent with the inference of a treatment effect. Observation of the obtained proportions indicates they are consistent with the inference that the effect is to increase the proportion of students who made more outgroup choices, thus supporting the general hypothesis.

By assuming interval data, and the random assignment of individuals to groups, the distributions of change scores may be examined to provide evidence for the comparisons set out in the experimental hypotheses by using the model of the simple analysis of variance. Two of the experimental hypotheses are tested by means of planned orthogonal comparisons, and two by means of less powerful post hoc comparisons by the criteria developed by Scheffe (Hays: Ch. 14).

The hypothesis that the treatment groups show a greater degree of positive change than the control group was investigated by testing the hypothesis that the mean positive change for the control group was less than the mean positive change for the average of the treatment groups, against the null hypothesis. [H_0: U cont. - (U tr.I + U tr.II) $\div$ 2 $\geq$ 0; H_1: U cont. - (U tr.I + U tr.II) $\div$ 2 $<$ 0.]

The value of t obtained for this comparison was -2.41 compared with the value required for significance with $\alpha = .05$ of -1.645. The null hypothesis is rejected and the evidence supports the experimental hypothesis.

The hypothesis that the Treatment II group shows a greater degree of positive change than the Treatment I group was tested against the null hypothesis that the mean positive change for Treatment II is equal to or less than the mean positive change for Treatment I.

$$H_0: \text{U tr.I} - \text{U tr.II} \geq 0; \quad H_1: \text{U tr.I} - \text{U tr.II} < 0$$

The value of t obtained, t = -2.05, was greater than the value of t required to reject the null hypothesis, t = 1.645, at the 95% level of confidence. The null hypothesis is rejected and the evidence supports the experimental hypothesis.

The hypotheses that the control group show less positive change than the Treatment I group, and that the control group show less positive change than the Treatment II group, can be tested by first carrying out an overall F test, and if this F proves to be significant, by post hoc comparison of the means. The overall value of F obtained of 3.12 is sufficient to reject the null hypothesis at the 95% level of confidence.

For the comparison of control with Treatment I [H_0: U cont. $\geq$ U tr.I; H_1: U cont. $<$ U tr.I] the value of $\hat{\psi}$ obtained was .182. This is less than the value required to reject the null hypotheses of .312 at the 95% level of confidence. Therefore the null hypothesis is accepted.

For the comparison of control with Treatment II [H_0: U cont. $\geq$ U tr.II: H_1: U cont. $<$ U tr.II] the value of $\hat{\psi}$ obtained of .442 exceeds the value required to reject the null hypothesis of .312; therefore there is sufficient evidence to accept the experimental hypothesis at the 95% level of confidence. This evidence tends to support a treatment effect between the control and Treatment II groups.

Each of the experimental hypotheses was then examined by means of the less powerful but more robust analysis of variance groups within treatments model on the assumption of a random assignment of groups to treatments (Lindquist 1956).

The overall value of F obtained by this method was 21 compared with the value of 9.5 required to reject the null hypothesis at the 95% level of confidence. The test supports the inference that there is a difference between the experimental groups. The nature of the difference was explored by means of post hoc comparisons of the means for each class. The differences between means are shown in Table 11. Those differences which are accepted as significantly different at the 95% level of confidence are marked with an asterisk.

Table 11

Differences Between Class Means, Sociometric Change Scores

	2A	1C	2B	1B	2C
1A	.058	.194	.083	.444*	.305*
2A		.250	.039	.500*	.361
1C			.111	.250	.111
2B				.361*	.222
1B					.139

*Statistically different

These data indicate that each of the control group classes differs from each of the Treatment II classes. They support the hypothesis that those exposed to the control condition differ from those exposed to Treatment II. None of the control group classes differ from the classes in Treatment I, a result which does not support the hypotheses that those exposed to the control condition differ from those exposed to Treatment I. Differences between the Treatment I classes and Treatment II classes are inconsistent. There is a statistical difference between one Treatment I class and one Treatment II class. The weight of statistical evidence supports the hypothesis of no difference between those exposed to the Treatment I and those exposed to the Treatment II conditions.

Inferences from Sociometric Data

The comparison of the distributions of change scores for each group by simple observation of the means reveals a pattern of apparent differences which are consistent with the hypothesis of a treatment effect in the direction of more positive change in the treatment groups than in the control group, and more positive change in the Treatment II than the Treatment I group. Comparison of pretest scores indicates that the groups do not differ from the differences to be expected by random assignment on the basis of pretest scores. Nevertheless, the statistical analysis of the data rests upon unsatisfied assumptions in each case. These data can be used to provide evidence for inferences, in a strict sense, only in a qualitative way. Inference will be guided by the tendency for these statistical data to converge. Since the departure from assumptions in the case of the groups within treatment model is less serious than for the simple analysis of variance model, more weight will be attached to the results from the former method.

The statistical evidence for each hypothesis is summarized below.

Hypothesis: $U \text{ cont.} < (U \text{ tr.I} + U \text{ tr.II}) \div 2.$

The hypothesis is investigated by means of a planned comparison. The comparison supports the hypothesis, and thus is consistent with an inference of a treatment effect in the hypothesized direction.

Hypothesis: $U \text{ tr. I} < U \text{ tr.II}$

Evidence from a planned comparison supports the hypothesis and is consistent with the inference that Treatment II is associated with a greater degree of positive change. Evidence from a *post hoc* comparison based on the groups within treatment model is inconclusive. The differences between each class in Treatment I and each class in Treatment II are in the expected direction, but only one of these differences is statistically significant.

Hypothesis: $U \text{ cont.} < U \text{ tr.I.}$

Statistical evidence from both models supports the null hypothesis, i.e. is against an inference that the treatment has effected a change.

Hypothesis: $U \text{ cont.} < U \text{ tr. II}$

Statistical evidence from both models supports the experimental hypothesis. This is consistent with the inference that the treatment is associated with positive change.

These statistical data provide convergent evidence for the hypothesis that Treatment II, the high forced compliance condition, is associated with the choice of more members of outgroups as seatmates.

The evidence for an association between the forced compliance, treatment conditions, and the choice of more outgroup members is affirmative, though derived from one test only. The evidence for a difference in effect between the high and low forced compliance conditions is positive from the more powerful technique and inconclusive from the less powerful. Convergent evidence from both statistical techniques denies an association between Treatment I and an experimental effect.

The evidence of association from this statistical analysis must be considered in relation to the possibility of an interaction between selection and treatments before causal inferences are made. The probability that the Treatment II group initially differed from the control and from the Treatment I group is low, but the possibility of an initial difference remains. Such a difference would be expected, from dissonance theory, to bring about a post-test difference in the direction of the hypothesis. Therefore the statistical evidence for the treatment effect in the high dissonance condition, for the greater effect of high dissonance, and for the general effect of dissonance versus the absence of dissonance are to be accepted with caution.

Playground Association Data

The criterion for changes in the individual's propensity to associate with members of other cultural groups in the playground is change in the number of the individual's outgroup associations from the pretest to the post-test. The proportion of students in each group to show no change, positive change defined as an increase in the number of outgroup associations, and negative change defined as a decrease in the number of outgroup choices, is shown in Table 12.

Table 12

Number of Students to Show Nil, Positive, and Negative Change in Each Experimental Group

	Control	Treatment I	Treatment II	
+ change	22	29	50	101
no change	15	17	8	40
- change	38	29	17	84
n	75	75	75	

Positive and negative change is associated with each experimental group. Positive change is greater in the treatment conditions than in the control condition and negative change is less. A chi-square test to examine the hypothesis that the proportions in each category in each experimental group do not differ yields a value of 24.0 which is significant beyond the .001 level. Thus different degrees of change are associated with the experimental conditions, and these changes, by inspection, are consistent with the hypothesis of greater positive change in the treatment groups. By inspection, change in the Treatment II group is proportionately greater than in the Treatment I group, and the change is in the expected, positive direction.

The distribution of change scores for each class, and for each treatment group is shown in Table 13. Inspection of the mean change scores for each experimental group reveals a pattern which is consistent with the general hypotheses that positive change will be greater for the treatment groups than for the control group, and that the Treatment II group will show more positive change than the Treatment I group.

Statistical evidence for the experimental hypothesis can be sought by means of the simple analysis of variance model which assumes the random assignment of individuals to experimental conditions and the analysis of variance model based on groups within treatments which assumes random selection of intact groups from a relatively large number of groups. As noted in the previous section, each of these assumptions is not satisfied by the sampling procedure, though the less powerful of the two models is the more robust.

The overall value of F obtained from the groups within treatments model of 2.84 is less than the value required to accept the hypothesis of a difference between groups at the 95% level of confidence of 9.55. The obtained value is sufficient to accept the hypothesis at the 80% level of confidence.

The overall value of F obtained from the simple analysis of variance model of 16.3 does exceed the value of 3.0 required for significance. The hypothesis of a difference between experimental groups is therefore accepted at the 95% level of confidence. The statistical results from this model relevant to each experimental hypothesis are summarized below.

Hypothesis: U cont. < (U tr.I + U tr.II) ÷ 2.

A planned comparison for this hypothesis yields a value of t which exceeds the critical value. The hypothesis is accepted at the 95% level of confidence.

Hypothesis: U tr.I < U tr.II

A planned comparison yields a value of t which exceeds the critical value. The hypothesis is accepted at the 95% level of confidence.

Hypothesis: U cont. < U tr.I

A *post hoc* comparison (simple analysis of variance model) yields a value of less than the critical value. The null hypothesis is therefore accepted.

Hypothesis: U cont. < U tr.II

A *post hoc* comparison (simple analysis of variance model) yields a value of greater than the critical value. The hypothesis is therefore accepted at the 95% level of confidence.

Table 13

Distribution of Playground Association Change Scores

	Frequencies								
	Control			Treatment I			Treatment II		
Scores	1A	2A	Total	1C	2B	Total	1B	2C	Total
+14								2	2
+13									
+12								4	4
+11								2	2
+10				1		1		4	4
+ 9				2		2		1	1
+ 8				1		1			
+ 7									
+ 6	1	1	2		1	1		2	2
+ 5	2		2		1	1	1	4	5
+ 4	1	5	6	2	1	3	5	2	7
+ 3	1	1	2	1	4	5	4	2	6
+ 2	2	2	4	6	4	10	9		9
+ 1	3	4	7	5		5	6	2	8
0	11	4	15	4	13	17	5	3	8
- 1	4	4	8	5	3	8	5		5
- 2	4	4	8	6	4	10	3	3	6
- 3	2	3	5	1	3	4	1	1	2
- 4	2	1	3	2		2	1		1
- 5	2	3	5	1	1	2			
- 6		2	2	1		1		1	1
- 7	2	1	3	1		1		2	2
- 8	2		2						
- 9	1		1						
-10									
-11									
-12									
-13				1		1			
n	40	35	75	40	35	75	40	35	75
$\bar{X}$			-.89			+.20			+1.45

Inferences as to Treatment Effects

The least powerful but more robust analysis indicates that the null hypothesis of no difference between the groups, and hence the inference of no treatment effect, must be accepted at the 95% level of confidence. The hypothesis that there is a difference between groups, which could be consistent with a treatment effect can be accepted at the 80% level of confidence. The evidence from the more powerful analysis is therefore contingent upon this level of confidence. That is, there is a 20% chance that an inference that there is a treatment effect is in error. The planned and post hoc comparisons do identify a significant difference between the control, and the average treatment groups, and a significant difference between the Treatment I, low forced compliance condition, and the Treatment II, high forced compliance condition. There is no significant difference between the control and low forced compliance condition.

Thus, while the distributions of changes in associations with other sociocultural groups considered qualitatively differ in directions consistent with each of the four experimental hypotheses, the statistical analysis provides only relatively weak support for the inference that the observed differences are not due to chance factors. The statistical evidence as to a difference between the control and low forced compliance condition is wholly negative, and the inference that there is a difference is denied.

The pretest mean scores and variance for each group are shown in Table 14.

Table 14

Pretest Scores, Playground Associations

	Control	Treatment I	Treatment II
$\bar{X}$	4.62	4.30	3.91
s^2	11.7	14.3	18.0

The means for each group were compared by *t* tests based on the assumption of random assignment of individuals to groups. The values of *t* for each comparison, and the level of confidence for the hypothesis that the means are different are: *t* for control, Treatment I comparison, .57 significant at the 40% level of confidence; *t* for control, Treatment II comparison, 1.14, significant at the 60% level of confidence; *t* for Treatment I, Treatment II comparison, .58, significant at the 40% level of confidence. These values all fail to reach the level at which a difference between groups can be asserted. That is, they do not provide positive evidence that the groups differ beyond the level to be expected by chance.

Should differences between these groups be present, the differences would be such as to associate the lower pretest scores with the treatment, dissonant conditions. Therefore, differences indicated by statistical analysis may be inferred to indicate a causal relationship only with the reservation that interaction between selection and treatment, though unlikely, cannot be ruled out.

The School Scale Data

School scale test results are changes in the scale scores of individuals on a scale of social distance which refers to the social distance between individuals in frequently occurring situations of social contact within the school. The criterion represents a change in the individual's disposition to associate with members of other sociocultural groups in situations of varying degrees of intimacy.

The pretest means and variances are shown in Table 15.

Table 15

Pretest Means and Variances, School Scale

	Control	Treatment I	Treatment II
$\overline{X}$	4.84	4.94	4.69
s^2	5.98	5.60	6.40
n	77	77	77

The hypothesis that a difference exists between each pair of means was investigated by means of a _t_ test. For the comparison of control with Treatment I, the _t_ value of .26 would allow a difference to be asserted at the 20% level of confidence; for the comparison of control with Treatment II the _t_ value of .37 would allow a difference to be asserted at the 20% level of confidence; and, for the comparison of Treatment I with Treatment II, the _t_ value of .64 would allow a difference to be asserted at the 40% level of confidence. Since each _t_ value falls short of the value required to assert that a difference between groups exists, the comparisons are consistent with the random assignment of individuals to groups on the basis of their scale scores.

The distribution of change scores for each experimental group is shown in Table 16, page 76.

By assuming a random assignment of individuals to treatment groups the experimental hypotheses may be tested against the simple analysis of variance model.

Table 16

Distribution of Change Scores, School Scale

Change Scores	Control	Treatment I	Treatment II
+7		1	1
+6		0	1
+5	2	0	1
+4	2	4	0
+3	7	3	6
+2	6	10	11
+1	19	17	19
0	14	15	22
-1	13	9	6
-2	7	4	5
-3	3	5	3
-4	3	4	1
-5	1	2	0
-6		2	1
-7		1	
n	77	77	77
$\overline{X}$	+.221	-.104	+.545

The hypothesis that the treatment groups show a greater degree of positive change than the control group was investigated by testing the hypothesis that the mean positive change for the control group was less than the mean positive change for the average of the treatment groups against the null hypothesis. [H_0: U cont. - (U tr.I + U tr.II) ÷ 2 ≥ 0; H_1: U cont. - (U tr.I + U tr.II) ÷ 2 < 0.]

The value of t obtained for this planned orthogonal comparison is .03, which is less than the value of t = -1.645 (229df) required to accept the hypothesis at the 95% level of confidence. Therefore the null hypothesis, that there is no difference between the control and the average treatment conditions, is accepted.

The hypothesis that the Treatment II group shows a greater degree of positive change than the Treatment I group was tested against the null hypothesis. H_0: U tr.I - U tr.II ≥ 0; H_1: U tr.I - U tr. II < 0. The value of t obtained for this planned orthogonal comparison is -1.91, which is greater than the value of t = -1.645 (229df) required to accept the hypothesis. Therefore the hypothesis that the Treatment II group does show a greater degree of positive change than the Treatment I group is accepted.

The hypothesis that positive change for the control group is less than positive change for the Treatment I group [H_o: U cont. $\geq$ U tr.I; H_1: U cont. $<$ U tr.I] and the hypothesis that positive change for the control group is less than positive change for the Treatment II group [H_o: U cont. $\geq$ U tr.II: H_1: U cont. $<$ U tr.II] were tested by means of post hoc comparisons. The overall value of F obtained of 1.64 is less than the value of 3.0 ($\alpha = .05$ at 2,22df) required for these comparisons. Therefore the null hypothesis is accepted in each case. There is no evidence which supports a significant difference between the control and Treatment I or between the control and Treatment II groups.

Statistical tests of the significance of the differences between the means of the experimental groups based on the more powerful simple analysis of variance model provide support for only one hypothesis, that the Treatment II group shows more positive change than the Treatment I group. Since this more powerful model failed to provide a significant value for the overall F test, the less powerful groups within treatments model can be expected also to fail to support a significant value for the comparison of each class in Treatment II with each class in Treatment I. Thus, the finding of a statistical difference between Treatment I and Treatment II is supported by the more powerful and less robust model, but not supported by the less powerful but more robust model.

Inference of Treatment Effect

An inference for the causal role of the difference between treatment conditions for the observed differences in positive change requires evidence that Treatment I and Treatment II groups did not differ on the pretest, evidence of consistency with simple random assignment of students, and/or that any differences which did exist could be expected to act against treatment effect. The result of the t test for the comparison of Treatment I and Treatment II on the pretest is consistent with the assumption of a random assignment. However, the comparison of the pretest means reveals that the differences which do exist yield a higher pretest mean for Treatment I than for Treatment II. The higher level of dissonance which is therefore associated with Treatment II may therefore be associated with it by virtue of the initially lower scores for this group, rather than by virtue of differences between the treatment conditions. That is, the different degrees of positive change may result from the interaction of selection and treatment, rather than from differences between treatment conditions.

The inference that differences between treatments caused different degrees of positive change is therefore conditional upon the rival hypothesis.

The Out of School Scale Data

The criterion measure derived from the Out of School Scale is change in the scale score of individuals on a scale of social distance which refers to situations of association outside the formal structure of the school, ranging in intimacy from the item, "I would go to the shops in town with one of these people", to the item, "I would have one of these people as my wife (or husband)". Positive change represents an increase in the degree of intimacy in the association.

The pretest means and variance are shown in Table 17.

Table 17

Pretest Means and Variances, Out of School Scale

	Control	Treatment I	Treatment II
$\overline{X}$	3.48	3.78	3.55
s^2	3.56	2.49	3.62
n	77	77	77

The hypothesis that each of these pairs of means differ was examined by means of a t test for each pair of means. For the comparison of control with Treatment I the t value obtained of 1.07 would allow a difference to be asserted at the 60% level of confidence; for the comparison of control with Treatment II the value of t obtained of .23 would allow a difference to be asserted at the 10% level of confidence; for the comparison of Treatment I with Treatment II the value of t obtained of .82 would allow a difference to be asserted at the 40% level of confidence. Since the obtained values are less than is required to assert a difference for each comparison the pretest data are consistent with the hypothesis that individuals are randomly distributed between treatment groups with respect to responses to this scale.

The distributions of change scores for each group are shown in Table 18, page 79.

On the assumption of a random assignment of individuals to groups, the experimental hypotheses can be judged against the null hypotheses by reference to the simple analysis of variance model.

For the hypothesis that the mean positive change for the control group is less than the mean positive change for the average of the treatment means [H_0: U cont. - (U tr.I + U tr.II) ÷ 2 ≥ 0; H_1: U cont. - (U tr.I + U tr.II) ÷ 2 < 0] , the value of t obtained for the orthogonal comparison is $t = -.19$. This value is less than the value of $t = 1.645$ required to accept the experimental hypothesis at the 95% level of confidence; therefore the null hypothesis is accepted.

Table 18

Distribution of Change Scores, Out of School Scale

Change Scores	Control	Treatment I	Treatment II
+6	1	0	1
+5	1	0	1
+4	1	0	2
+3	3	2	2
+2	7	11	9
+1	12	12	20
0	25	23	22
-1	15	14	10
-2	5	6	3
-3	5	7	5
-4	1	2	2
-5	1	0	0
-6	0	0	0
n	77	77	77
$\bar{X}$	+.013	-.195	+.312

For the hypothesis that the mean Treatment I group is less than the mean Treatment II group [H_0: U tr.I - U tr.II $\geq$ 0; H_1: U tr. I - U tr.II $<$ 0], the value of *t* obtained for the orthogonal comparison is *t* = -1.81. This value is greater than the value of *t* = -1.645 required to accept the experimental hypothesis at the 95% level of confidence; therefore the hypothesis that the Treatment II group shows a greater degree of positive change than the Treatment I group is accepted.

For the hypothesis that the mean change for the control group differs from the mean change of the Treatment I group and from the mean change of the Treatment II group, the overall value of F obtained of 1.58 is less than the value required (F = 3.0) to proceed with *post hoc* comparisons. Therefore the null hypothesis of no difference between the control group and each of the treatment groups is accepted.

Inference of Treatment Effect

The examination of results by reference to the simple analysis of variance model provides statistical support for only one of the hypothesized differences -- that the Treatment II condition is associated with more positive change than the Treatment I condition. This hypothesis is supported by the more powerful statistical model but is not supported by the less powerful groups within treatment model, since the value of the overall F for the more powerful model is less than is required for significance.

Comparison of the pretest scores for the Treatment I and Treatment II groups indicates they are consistent with the random assignment of individuals to treatments. Should the differences in these pretest means interact with the treatments the theoretical expectation is that the higher mean of the Treatment II group would act against the treatment effect. The statistical evidence, therefore, provides support for the inference that the difference between treatments caused the obtained differences in positive change on this condition.

Semantic Differential Data

The semantic differential test is made up of five bipolar scales (clean-dirty; kind-cruel; happy-sad; fair-unfair; good-bad) found to have high loadings on an evaluation factor by Osgood and Suci (1955), and judged to have definable meaning to New Guinea students in pretrials. The individual's score is an average of his responses to the five scales. The criterion is change in the individual's score from pretest to post-test, a change which is considered to measure changes in a generalized attitude toward members of the outgroup.

The test-retest reliability of the instrument was obtained from a sample of students from the same culture area as the students in the experimental sample who attend the Goroka Technical School. The test was administered to a random sample of 73 students with a 10-day interval between the initial test and the retest. The coefficient of stability obtained (Pearson r) was .64. This compares with r's of .83 to .91 reported by Osgood (1957). The relatively low reliability of the instrument suggests that temporal change is significant for the interpretation of an individual's attitude and change in the individual's attitude over time. Cronbach (1960: 287) suggests that for confidence to be placed in the difference between an individual's score from time one to time two when the coefficient of stability is in the order of .70, the difference needs to be twice the standard error of measurement.

The mean scores for each group are shown in Table 19.

Table 19

Pretest Scores, Semantic Differential

	Control	Treatment I	Treatment II
$\bar{X}$	15.9	15.7	16.1
s^2	5.31	5.28	6.30

No differences between means are indicated. The results are consistent with the hypothesis that the individuals in the groups are randomly distributed with respect to semantic differential scores.

The change scores for the three groups are shown in Table 20.

Table 20

Mean Change Scores, Experimental Groups, Semantic Differential

Control	Treatment I	Treatment II
$\overline{X}_1$	$\overline{X}_2$	$\overline{X}_3$
+.27	-.31	+.47
n = 77	n = 77	n = 77

Observation of these means indicates an apparent small degree of change in scores, compared with an average score on the test of 15 to 16. The changes do accord with changes to be expected on the hypothesis that treatments will show greater change than the control condition but the changes are not consistent with the hypothesized direction of change. Change for the Treatment I condition is negative rather than the positive change expected.

The hypothesis that the mean change scores differ was investigated first by means of the simple analysis of variance model, on the assumption of random assignment of individuals to groups. Comparison of change for the control group with change for the average of the treatment groups by means of an orthogonal comparison yielded a *t* value consistent with the null hypothesis. Comparison of the Treatment I group with the Treatment II group by the same method also yielded a *t* value consistent with the null hypothesis. The overall value of F obtained, .41, is less than is required for significance. Thus there is not sufficient evidence to reject the null hypothesis for the comparison of the control group with Treatment I and Treatment II groups.

This evidence is consistent with no difference in the amount of change between the control and the average of the treatment groups, between the control and each treatment group, and between the two treatment groups. Thus the inference of a treatment effect upon the students' general evaluation of other sociocultural groups is not supported.

Chapter VI

CONCLUSIONS

Theoretical Significance

This study has attempted to assess the consequences of two treatment conditions for change in the association behavior and change in attitudes toward association of students from different sociocultural groups within a tribal society. The treatment conditions are conceptualized as forms of forced compliance. Treatment I is a condition of forced compliance in the form of contiguity as a seatmate with a member of a different sociocultural group. Treatment II is forced compliance in the form of contiguity as a seatmate and participation in group tasks with a member of another sociocultural group. The treatment conditions required that each student associate with a member of another sociocultural group, a forced 100% association with other sociocultural groups, whereas the control condition allowed free choice of association, of which 57% were associations with a member of a different sociocultural group. There were no differences between the control and treatment groups with respect to the perception of rewards or punishments associated with the conditions. Therefore the treatment conditions are considered to be conditions of forced compliance in the absence of either high rewards or punishments.

The forced compliance condition is related to the treatment effects by means of the construct of cognitive dissonance which predicts that behavior under this condition will produce cognitive restructuring to bring cognitions and sentiments into consistency with the individual's ongoing behavior. The assessment of treatment effect is an indirect test of the predictions derived from this construct. Several criterion measures have been used to assess treatment effect. Of these, change in the sociocultural composition of the individual's freely chosen playground associates is considered to be most directly related to the treatment conditions of forced association with members of other sociocultural groups in the classroom. Change in the sociometric choice of classroom seatmates is a criterion with specific reference to the treatment behavior but in addition reflects change in the individual's disposition to associate. Both of these criteria refer to behavior which is closely related to the treatment conditions; the behavior referents of the criteria are specifically related to association in the classroom.

The other criteria are designed as measures of change in dispositions. The School Scale refers to a number of behavioral situations within the school but not directly related to the treatment condition of association in the classroom. The Out of School Scale refers to a number of behavioral situations which are socially and temporally distant from the treatment conditions of association within the classroom. The Semantic Differential has no implicit behavioral referents and is the most general and abstract of the measures of change in disposition. That is, these are criteria of disposition change toward behavior which have a general, less specific relationship to the treatment conditions than the playground association and sociometric choice criteria.

Hypothesis 1 (page 17) states there will be more positive change for the treatment groups than for the control group $\left[H_1\text{: U cont.} < \frac{\text{U tr.I} + \text{U tr.II}}{2}\right]$. This hypothesis is confirmed by means of a one-way analysis of variance for both of the criteria specifically related to the treatment conditions, although the confirmation is subject to the possibility that it is due to an artifact introduced by a selection/treatment interaction, a possibility judged to be unlikely from the results of pretest comparisons. The null hypothesis of no difference between the control and the average treatment effect is accepted for the criteria with a less specific relationship to the treatment conditions.

The support for an average treatment effect for the criteria specifically related to the treatments is consistent with an inference for the effect of dissonance upon specifically related criteria, but there is no support for the effect of dissonance upon the more general dispositions of the subjects.

Hypothesis 4 states there will be more positive change for the Treatment II group than for the Treatment I group [U tr.I < U tr.II]. This hypothesis is confirmed for the criteria specifically related to the treatment conditions, and it is supported for the two attitude scales with behavioral referents generally related to the treatment conditions. The statistical support is derived from the simple analysis of variance model but is not confirmed by the groups within treatment model. There is no evidence for this difference for the most general level of disposition criterion.

These data support the inference of a difference in effect between the two treatment conditions across the four criterion measures which proved to be sensitive to the experiment. On the Out of School Scale this difference is confirmed without the threat to causal inference posed by a selection/interaction hypothesis. The relationship of this difference between treatments to the influence that the difference is related to the degrees of dissonance (low versus high) associated with the treatments requires discussion.

A dissonance interpretation requires, strictly, that both treatment conditions are associated with gain scores. That is, there should be a mean increase in the scores of each treatment group. These treatment gains were observed for the playground association and sociometric criteria, those with specific behavior relevance to the treatment conditions, but are not observed for the attitude scale criteria. For these criteria the results show a small mean loss score for the Treatment I group, and a mean gain for the Treatment II group. That is, the evidence across the four criteria which are sensitive to change does not consistently support the inference that dissonance is the factor which causes the difference.

Yet the data tend to converge to indicate a difference in effect between the condition of forced association and the condition of forced association which required participation in the solution of group tasks. The interpretation which is consistent with the difference is that it is the participation in group tasks characteristic of the Treatment II condition which is causal for the difference between Treatment I and Treatment II. In this study contiguity between members of different sociocultural groups does not lead to uniformly positive changes, but contiguity which is combined with participation in group tasks does cause uniformly positive changes in other associational behavior and does cause the formation of more positive dispositions than contiguity alone. The conditions under which this finding occurs are those in which the interaction is between groups which do not differ with respect to the perceived relative status of individuals within them and with respect to the rewards or punishments associated with the different conditions.

Hypothesis 3 predicts that positive change associated with Treatment II will be greater than positive change associated with the control condition [H_1: U cont. < U tr.I]. This hypothesis is confirmed by the data for changes in playground associations and for sociometric choice (by both statistical models) but is not confirmed for the attitude scales which refer to more general behavior. For these criteria the changes for Treatment II are in the expected direction but are not statistically significant. These data support the inference that association accompanied by participation in group tasks where that association is required by the social situation, will lend to greater association in closely related situations in which the individual has free choice of associates. They do not support an inference that this form of association will lead to more positive general attitudes across less related behaviors. Considered alone, the finding would support the inference that the condition of high dissonance is associated with behavior change. This inference fails to be supported, however, by the lack of a concomitant change in the scales which measure sentiment, and by the lack of a consistent positive change for the Treatment I condition.

Hypothesis 2 predicts that the treatment condition of forced association of seatmates will be associated with greater positive change than the control condition [H_1: U cont. < U tr.I]. There is consistent evidence across the criteria which are sensitive to change that this hypothesis is not supported. There is no evidence either in support of the assumption that dissonance associated with this treatment caused either a positive or negative change in associational behavior or sentiments relative to the control condition. The pattern of the association of a slight positive change with this treatment for the criteria with specific behavioral relevance to the treatment, and of the association of a slight negative change with this treatment for the criteria with general behavioral relevance, is apparently due to chance variations when judged by statistical criteria.

Yet this pattern is of practical and theoretical interest for the question of whether association under conditions of forced compliance does act to increase or to decrease positive sentiments, or, as the above finding suggests, is neutral with respect to sentiment change. The essentially neutral finding in this study for the effect of contiguity accords with the finding of Webster that association between white and Negro students in a school did not produce positive effects, while the observations of the actual interactions of students in the Treatment I condition accord with the finding of Yarrow *et al*. (1958) that white and Negro students in a camp showed more cooperation and conformed to the expectation of the camp leaders. Further studies of longer duration and across interaction situations of greater intimacy are required to clarify the consequences of simple contiguity within the school. The trends in the data of mean changes in this study suggest that further studies may show positive or negative change.

Taken together, the results indicate that the limited evidence in support of the theory of cognitive dissonance provided by the evidence from a comparison of the control group with the average of the treatment groups is not confirmed by the evidence for the expected difference between the control and Treatment I groups, or by the pattern of results for the comparison of Treatment I and Treatment II. This study, therefore, does not indicate support for the theory of cognitive dissonance from which the treatments were derived. The evidence does support the following propositions:

1) where contiguity is required by the social system, and the contiguity is associated with participation in group tasks between individuals of different sociocultural groups, this condition leads to an increase in the association between individuals of different groups, and a willingness to associate between those individuals, beyond the level to be found where the individuals do not participate in group tasks and are not required to associate;

2) compared to a condition in which individuals are required to associate in a social system, a condition in which individuals are required to associate *and* to participate in the solution of group tasks leads to an increase in the voluntarily chosen associations between individuals from different sociocultural groups and to the formation of more positive attitudes between the members of different sociocultural groups.

That is, more generally, the results support the proposition that association which is required by the school social system, or a condition of forced compliance, when combined with participation in group tasks, causes greater positive change than either a condition of free choice without group tasks or a condition of forced compliance without group tasks. This finding is consistent with the propositions of Yarrow, Yarrow, and Campbell (1958) and McDonald (1965), but generalizes them to the New Guinea Highland societies, and provides empirical support for the effect of a forced compliance condition.

Practical Significance

The observations made for this study have shown that students in New Guinea highland high schools who are members of sociocultural groups whose traditional cultures emphasize the development of attitudes of hostility toward members of other groups, are, as a result of participation in the social structures of the schools, forming associations with members of other groups. Across the sample used in the study, between 40 and 50 per cent of the first and second form students chose to associate in the classroom with a student from a different group. The experimental conditions, and the observations of students' perceptions of the conditions, indicate that students do not perceive an increased degree of association to be either potentially highly rewarding or aversive. That is, they appear to conform to an increased degree of association where this is required by the system. Further, the results of students' replies to a questionnaire indicate an absence of perceptions of any general status differences between students.

These conditions of interaction accord with those proposed by Homans as both necessary and sufficient to promote the formation of positive sentiments. While these conditions obtain there is potential for action by the schools to increase the degree of interaction and so facilitate the formation of these positive attitudes.

This study has shown that when the school increases intercultural group associations, a program which increases the degree of participation by students from different sociocultural groups in cooperative activities leads to an increase in the number of intergroup associations and an increase in the expressed preferences to associate in situations which are socially close to those under which the cooperative activities take place, and to a positive change in more general attitudes. The findings suggest that further programs in the other behavior settings under the control of the school can be expected to accelerate the growth of positive attitudes.

The nature of these programs can be derived from the specification of the conditions which led to this treatment effect. The school social system was structured to allocate students into mixed sociocultural groups within which there was an equal number of members from each sociocultural group. Each group was allocated a number of tasks, each of which had a single outcome which was reinforced. In addition to these conditions, two other relevant variables were associated with the successful treatment and therefore require replication in programs to extend or replicate the treatment. The treatment is associated with feelings of individual equality between students and the tasks set are within the domain of non-traditional activities designated by the school. Since these variables may interact in that tasks related to the traditional activities of a sociocultural group may evoke perceptions of traditional status, the construction of further programs might profitably begin with tasks which are specific to the schoolboy role of the students.

In addition to the classroom setting, three of the behavior settings in the highland schools provide opportunities to structure students' behavior under the above conditions. The dormitory provides an opportunity to allocate students from different sociocultural groups to adjacent beds and to form groups of equal numbers of members of different groups to which specified tasks in the form of duties and responsibilities for maintaining cleanliness and ordered behavior can be assigned. Reinforcement of the performance of these tasks, in the form of normal approbation, can be given by the school staff. Student work groups, which provide the setting for student activity for several hours each day, can also be structured to form inter-sociocultural group teams and allocated school specific tasks to be reinforced by teachers. The third behavior setting, in which students participate each day, the evening study period, is directly analogous to the classroom setting so the structure defined above for the classroom can be expected to apply to it.

The schools include a number of behavior settings such as clubs and sports teams in which membership is determined by criteria of individual interest and/or skill of the student rather than by the criterion of sociocultural membership or academic achievement. The interaction between students within these structures has not been quantitatively observed in the present study, but empirical observation suggests that a wide range of interactions take place between both individuals and subgroups within them across dimensions from cooperation to competition. Further study of the membership, organization, and the nature of the tasks associated with these structures would be required before the findings reported here might be judged to be applicable to these less formal behavior settings.

The comparison of the condition under which students associated with members of the other sociocultural groups as a result of their free choice, with the condition in which students were required to associate with members of other groups, has indicated a conclusion of no difference for their effect upon association in other behavior settings or upon the formation of attitudes. The observation of apparent slight negative changes in association with the forced association condition, however, indicates that the consequences of this condition require further investigation before the schools attempt to increase association. The results do not support Homans' contention that increased frequency of interaction does produce positive attitudes, for it may be that either neutral or negative consequences follow from a socially induced increase in association above the association which is freely chosen by individuals.

Methodology

The effects of the treatments provided for individuals in this study have been assessed by means of two types of criteria. The playground association and sociometric criteria required the subjects to respond to individual students and their responses were then coded into sociocultural groups. These criteria proved to be more sensitive to treatment effect. The attitude scale criteria required the individual subject, for whom the treatment consisted of association and interaction with an individual student from a different sociocultural group, to respond to that group as an entity. That is, the criterion implicitly required the subject to generalize from contact with an individual to contact with the group. While two of these scales proved to be responsive to the treatments, the most abstract criterion, the semantic differential, did not. In the condition of an emergent sociocultural group identification as in the Highlands of New Guinea, and with subjects at the early secondary school level, a criterion which requires generalization and abstraction of an effect associated with one individual to members of his sociocultural group may not be the most precise test of treatment effect. Where the treatment provides for association with an individual, change in attitude toward that individual would provide a more precise criterion; where the criterion is change in attitude toward a group, treatments which provide for contact between the subject and more than one individual from the target group may be required before the criterion measure becomes sensitive.

The attitude scale criterion measures yielded coefficients of stability between .76 for the Out of School scale and .64 for the semantic differential. These are low relative to the coefficients reported in the literature which pertain to the use of an identical scale (the Semantic Differential) or similar social distance scales with older groups, with groups in western cultures, and in societies in which group stereotypes are perhaps relatively stable compared with New Guinea. Each of these differences between the target groups and the groups in New Guinea may account for some of the instability of response in this study. The presence of instability suggests both that further scale development is advisable and behavioral indices should be used in future studies in New Guinea.

The treatments provided in this study brought about interaction between students in one of the behavior settings of the school for a period of seven weeks. This form of interaction was associated with perceptible change which allowed for analysis of the effect of Treatment II compared with the control group. Further study of the effects of Treatment I will require a treatment of longer duration and exploration of the effect across other behavior settings provided within the school.

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APPENDIX A I

Ia) Design for Group Tasks

Dear Teacher,

Here is a design for the group tasks. The general idea is to have students actively working together on tasks, and to commend their joint work and to provide assessment of their joint efforts as well as of their individual work.

Design for Group Tasks

Composition of Groups

i) Students are arranged as pairs of interethnic seatmates by the experimenter.

ii) A group may be made up of a pair or of two or more pairs. There probably will be few opportunities for groupings larger than two pairs. Two-pair groups are probably most easily formed from pairs in adjacent seats. No fixed choice of combination is required given that larger groups are made up of seatmates, but the grouping which gives the highest number of members of different ethnic groups is preferred.

Content of Tasks

iii) The ordinary subject matter of the lesson is to form the content of the task for the group. Thus the tasks might be: (You will think of many better than these mundane examples.)

Math - completion of a number of written math problems; discussion to suggest solution steps for oral problems;

English - completion of comprehension exercise; group discussion of ideas to put into a composition; making alternate verses of a four-verse poem; preparation of a joint mime;

Social Studies - making a map; completing a summary; reading a text for ideas which are then compared before recording; preparing a short lecturette;

Art - a group picture, model, frieze, i.e. division of a task into sections for each individual to complete, students or teacher to decide on division of effort;

Science - lab work in pairs; pairs or groups to work on the solution of problems; pairs compare sketches of specimens before making individual records in books.

iv) Assessment and Commendation

Except for class tests, wherever possible the task is to be assessed as a group effort. If the task is a set of math problems the teacher might ask the group for a show of hands to indicate whether their group was correct; each individual might record the number of correct solutions of his group. If the assessment is by way of a grade given by the teacher, the group effort should be assessed, e.g. for a group discussion of ideas to be put into a composition, the mark might well be placed on the list of ideas to which each student has contributed. The group, rather than the individual should similarly receive verbal commendation for effort, e.g. "X and Y groups have done very well in this lesson."

This focus of assessment and commendation upon the group need not preclude a focus upon the individual also.

Where class tests are conducted the individual will remain the unit for assessment and commendation.

Distribution of Group Tasks over Time

v) The group task(s) may not necessarily occupy the class for the whole of any given lesson period. However, I would hope to have the total time to be spent on group tasks for each week maintained within that week, whether in the two or three full lesson periods or spread over a larger number of periods in that week. If the treatment is to be effective, there should be a gradual accumulation of effect, hence regular work with group tasks each week to maintain frequent exposure to the treatment.

A form of log for each class will assist me to interpret any difference in results between 1B and 2C which may occur.

Can we discuss any further ideas that may be worthwhile by way of additions, modifications or alternatives you may have?

Yours,

Richard Pearse.

Class Teacher Subject

WEEK 1	Time devoted to group task	Brief description of task, e.g. reading comprehension	Comments
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			

APPENDIX A I

Ib) Examples of Procedure for Group Tasks

PRACTICE LESSON

Form
(i) Demonstration of examples on b.b. by teacher with oral student-teacher discussion.
(ii) Written practice examples worked by students - work problems, complete comprehension exercise, draw map, make picture, etc.
(iii) Assessment and commendation of students' work by display of work, marking examples.

Conversion to Group Task Procedures:

1. Form of lesson remains unaltered.
2. (i) Teacher asks student pairs to discuss their answers before making suggestions to the teacher, one of the pair to raise hand with suggestion.
   (ii) The pair of students work one set of examples between them.
      e.g. a) alternate math problems in alternate books.
      b) one work sheet between two students.
      c) one group diagram or map made from individual sketch diagrams or maps.
   (iii) The major unit for assessment and commendation is the one joint task.
      e.g. a) individual students record the mark for the joint effort as their mark.
      b) teacher records the joint mark.
      c) pairs of students show hands for the number of correct examples.
      d) pairs of students display work to class.

NARRATIVE AND EXPOSITION LESSON

Form
(i) Teacher narrates or explains lesson content.
(ii) Oral recall and/or discussion.
(iii) Recording by means of summary, completion exercise, student drawing or diagram.

(iv) Assessment and Commendation.

Conversion to Group Task Procedures:

1. Form of lesson remains unaltered.
2. (i) Before teacher begins narration or exposition students told they will be asked to make a response in pairs to questions and to summary or recording.
   (ii) a) Before oral questioning students asked to discuss material between them to prepare for questions (say 3 or 4 minutes of student discussion).
      b) Teacher addresses questions to pairs, asks for responses from pairs, e.g. "What does your pair think, John?" John may respond, "We think x" or "I think y but he thinks z".
   (iii) One joint summary or completion exercise to be prepared, e.g. students jot notes on pieces of paper, compare notes, then compile a summary.
   (iv) Assessment and commendation of the joint product -- answers to questions, discussion, and summary.

Comments

APPENDIX A II

II) Classroom Interaction Rating Form

Cooperation (individuals participate together)	Independence (individuals act separately)	Competition (individuals act together)	Dominance (one individual acts)	Submission (one individual accepts dominance)	Conflict (individuals act together)
- gives help with a task - advice - lends materials - plays his part in a joint activity	- no contact - person does not compare his actions to the other	- does something that prevents other from doing it - attempts to answer questions first - uses materials first - tries to excell	- shows hostility - criticizes other - uses materials first	- accepts other dominance	exchange of - argument - physical violence - dispute over materials, order of going first, etc.
L.H. R.H.					
				TOTALS	
				Percentage	

APPENDIX A III

School Scale

What is the name of your people? ____________________

Where do you live?   Near? ____________________

Here are some sentences about a people who are in this area.

If you agree with a sentence write yes next to it.

If you do not agree with a sentence write no next to it.

Write yes or write no next to each sentence.

Remember to write down the answer which shows what you really think.

Here are some sentences like the ones you will do.

	BENAS
I want to be with these people when they talk place in the dormitory.	____________________
I like these people to stay together in their own place in the playground.	____________________
I would ask these people to help me with my homework.	____________________

BENAS

1. I want to share my secrets with these people. __________

2. I want to buy something for one of these people when he (or she) has no money. __________

*3. I want to try to sleep next to one of these people in the dormitory this year. __________
(Mean = .61)

4. I would not tell the teachers when these people do not do their work. __________

5. I want to be on the side of these people when they fight with my one talks. __________

6. I want to have one of my people in my group to visit another school. __________

*7. I want to go to the pictures with these people and not with my one talks. __________
(Mean = .32)

*8. I want to ask one of these people to sleep next to me in the dormitory. __________
(Mean = .57)

9. I would not tell the prefects when these people do not do their work. __________

*10. I want to be on the side of these people when they argue with my friends. __________
(Mean = .19)

11.R I feel cross with these people when they use my things. __________
(Mean = .53)

*12. I want these people to live in my dormitory. __________
(Mean = .66)

13. I want to lend my books to these people. __________

14. I want one of these people to work with me in my school garden this year. __________

*15. I want to sit next to one of these people in class. __________
(Mean = .68)

16. I want one of these people to be my best friend. __________

17. I would be on the side of these people when they argue with my one talks. __________

18. I would try to get one of these people to work with me in t class. __________

19. I want to learn the language of these people to talk with them. __________

*20. I would lend my clothes to these people. __________
(Mean = .46)

21. I want these people to be in my group in the playground. __________

22. I want to be in a sports team made of these people. __________

23. I like these people to eat their food together in the mess. __________

*24. I want to share my own food with these people. __________
(Mean = .80)

APPENDIX A IV

Out of School Scale

What is the name of your people? ____________________

Where do you live? Near? ____________________

Here are some sentences about a people who are in this area.

If you agree with a sentence write yes next to it.

If you do not agree with a sentence write no next to it.

Write yes or write no next to each sentence.

Remember to write the answer which shows what you really think.

Here are some sentences like the ones you will do.

	BENAS
These people should not live in the Highlands.	________
I would work in the place where these people live.	________

BENAS

1. I would buy food from these people at the market. __________

2. These people should learn to follow the customs of my people. __________

3. I would work with these people in my job. __________

4. I would barter things with these people. __________

*5. I would work in the place where these people live. __________
(Mean = .57)

6. I would go to a sing sing these people give. __________

*7. I would have one of these people as my wife (or husband). __________
(Mean = .36)

8. These people should stay in their own place to work in jobs. __________

9. I would go to the market with these people. __________

10. I would learn the songs and dances of these people. __________

11. These people should not live in the Highlands. __________

12. These people should speak only their own language. __________

13. These people should live in their own part of town. __________

14. I would have these people in my district. __________

15. These people should marry only their own people. __________

*16. I would go to the shops in town with these people. __________
(Mean = .64)

17. These people should go to church in their own place. __________

18. I would speak the language of these people. __________

19. I would go to church with these people. __________

20. I would have one of these people as the husband or wife of one of my brothers or sisters. __________

*21. I would have these people live close to my village. __________

(Mean = .59)

*22.R These people should play sport only with their own people in their own teams. __________

(Mean = .80)

23. I would play sport in a team with these people. __________

*24. I would have these people come to see me in my village. __________

(Mean = .62)

APPENDIX A V

Semantic Differential

Here are some words about different things. In between each two words are seven spaces. Choose the space between the words which shows what you think about each thing. Put a tick in this space.

a) Here are three men. (Diagram of men of different heights)
Put a tick in a space for

short:_____:_____:_____:_____:_____:_____:_____:tall

Put a tick in a space for

short:_____:_____:_____:_____:_____:_____:_____:tall

Put a tick in a space for

short:_____:_____:_____:_____:_____:_____:_____:tall

b) Think about kau-kau.
Put a tick in a space for kau-kau.

sweet:_____:_____:_____:_____:_____:_____:_____:sour

c) Think about your friend.
Put a tick in a space which shows what you think about your friend.

honest:_____:_____:_____:_____:_____:_____:_____:dishonest

Now, here are some words about a people. Put a tick to show what you think about these people. The . . . . BENA . . . . people

clean:_____:_____:_____:_____:_____:_____:_____:dirty
kind :_____:_____:_____:_____:_____:_____:_____:cruel
happy:_____:_____:_____:_____:_____:_____:_____:sad
fair :_____:_____:_____:_____:_____:_____:_____:unfair
good :_____:_____:_____:_____:_____:_____:_____:bad

APPENDIX A VI

Sociometric

Dear Student,

1. Please think of the names of the students in this class you would like to sit with in class.
2. On the first line write down the name of the person you would like to sit with the most. On the second line write down the name of the person you would like to sit with after this person. On the third line write down the name of the next person you would like to sit with.
3. You may write down as many names as you wish.
4. My name is ______________________________.
5. I would like to sit next to:
    1. ________________________________
    2. ________________________________
    3. ________________________________
    4. ________________________________
    5. ________________________________
    6. ________________________________
    7. ________________________________
    8. ________________________________
    9. ________________________________
    10. ________________________________

APPENDIX A VII

Playground Survey

Class:

Date:

Time:

1. Write down the names of the people you were with for *most of recess time*. (If you were by yourself put down your own name only.) Next to each name write down the name of the person's people or place and the class he or she is in. If you don't know the person's people, write . . . . don't know.

NAME	People or Place	Class

2. Here is a map of the playground. Put a cross (X) on the place where the group you were in *for most of the time was*.

3. You have shown the group you were in most of the time.
   (a) Now put a circle around the number of groups you were in.
   1 2 3 4 more than 4
   (b) Now go back to the map and put a tick where the other groups were.

APPENDIX A VIII

Perceived Rewards and Perceived Relative Status Questionnaire

Dear Student,

Here are some questions about the student you sat next to for this term. Place a tick (✓) next to the answer which shows what you think.

1. When I sit next to this student my school work:
    a) gets better _____
    b) gets worse _____
    c) stays the same _____
    d) I don't know _____

2. When I sit next to this student, my friends:
    a) like me more _____
    b) like me less _____
    c) like me the same _____
    d) I don't know _____

3. When I sit next to this person, my teachers:
    a) like me more _____
    b) like me less _____
    c) like me the same _____
    d) I don't know _____

4. This student is:
    a) older than I am _____
    b) the same age _____
    c) younger than I am _____
    d) I don't know _____

5. This student is:
   - a) better at school work than I am _____
   - b) the same as I am at schoolwork _____
   - c) not as good as I am at schoolwork _____
   - d) I don't know _____

6. This student is:
   - a) better at sport than I am _____
   - b) the same as I am at sport _____
   - c) not as good at sport as I am _____
   - d) I don't know _____

7. This student has:
   - a) more friends than I have _____
   - b) the same number of friends as I have _____
   - c) fewer friends than I have _____
   - d) I don't know _____

8. The people of this student are:
   - a) more than my people _____
   - b) the same number as my people _____
   - c) fewer in number than my people _____
   - d) I don't know _____

9. The people of this student:
   - a) know more about new ways than my people _____
   - b) know the same about new ways as my people _____
   - c) know less about new ways than my people _____
   - d) I don't know _____